The Talent Gap in Family Firms*

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Abstract

Using data from Danish military draft sessions we document three results: First, employees in family firms have on average lower IQ than employees in non-family firms. This gap is higher for CEOs and in high-skill job occupations. Second, the IQ gap is correlated with other well established measures of talent. Third, the employee IQ is positively correlated with management practice, which is significantly lower in family firms. We also document that family members at all levels on average have higher IQ than non-family members but family leaders tent to hire employees with lower IQ relatively to non-family leaders. Our findings are consistent with that the talent gap is rooted in family firms' lower ability to identify and provide incentives for talented individuals.

Keywords: Family Firms, Employee Quality, IQ
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I Introduction

Are family firms able to attract the most talented employees? Is there a talent gap between employees in family and non-family firms? On one side, family firms are prone to prioritise the hiring of family members and friends (nepotism); to restrict the career options of non-related employees (glass ceilings); to pay lower wages for comparable jobs; and, to have less management practise in place, which makes identification of outstanding employee contributions harder. These characteristics suggest that family firms are less attractive for talented employees. On the other side, family firms are known to be loyal to existing employees, which provide a safety net and reduce uncertainty; to be long term oriented in their business strategies, thus they are more patient in developing creative ideas into valuable business; and, to identify value drivers they trust and have a flatter governance system, thus smart people obtain more authority and bigger operational space. These characteristics suggest that family firms are more attractive for talented people.

We investigate the allocation of talent across family and non-family firms in Denmark using data from military draft sessions. It is compulsory for all men at the age of 18 to go through the military draft session. This session involve basic medical tests and an intelligence test with the aim of evaluating if men are qualified to do military service. We have access to the results of this test for all Danish men below 40 years and this constitute our primary measure of talent. The IQ test is a simple multiple choice test with 70 questions which gives 1 point per question, so the scale runs from 0 to 70. Almost all individuals lie between 25 and 55 with a mean of 42 for the entire population.

We begin by documenting the existence of a talent gap between family and non-family firms: employees in family firms have on average lower IQ than employees in non-family firms. We observe a clear and significant lower distribution of IQ in family firms, both for the whole population of employees and for incoming employees. As an illustration, in the overall sample of all employee we show that the median IQ level in non-family firms is the 45 percentile IQ level in family firms. These differences hold across hierarchies

and are statistically significant for both non-managers, managers and CEOs.

We are interested in the details behind this talent gap and its possible explanations. Talent as measured through IQ may matter more for high-skill job categories than for low. To test the IQ gap across job categories, we split job categories into high, medium and low skill jobs, based on the average IQ of employees who hold these jobs based on the national data. We then show that the talent gap is higher in high-skill job categories and smaller in low- and medium- skill job categories. Thus, it is exactly in the jobs where IQ normally is very important, that family firms hire lower IQ talent.

Our measure of employee talent is only available for men that are around 40 and below due to that the military only saves detailed data from 2007 and onward. It is, therefore, important to know if the talent gap only exists for younger male employees or it exists for female and older male employees, managers and CEOs as well. We address this by estimating personal and firm fixed effects in the entire sample of employees. We exploit individual job moves across firms to decompose variations in wages into personal and firm fixed effects. We follow the literature and use the personal fixed effects as a broad measure of talent. By doing this, we confirm the talent gap between family and non-family firms sustain in both the all-men sub-sample and in the entire population of employees in private firms in Denmark. The talent gap measured through the difference in personal fixed effects is large and statistically significant for all employees, managers and CEOs.

Confirming the talent gap through estimating variation in personal fixed effects in the mover analysis not only extents the validity of our results to the entire group of employees, it also provides a novel contribution, by documenting that the personal fixed effects in the AKM model (Abowd et al 1999) correlates with other talent measures such as IQ. Our analysis, therefore, provides support for the interpretation of the personal fixed effects as a valid measure of employee talent.

Next, we investigate potential explanations for the talent gap between family and non-family firms. We focus on three possible explanations: nepotism, labor supply and

management practice.

Our first conjecture is that the talent gap arise from nepotism, that family firms hire less qualified family members and their friends and close connections. This is a common theme in the family business literature (Jaskiewicz et al. (2013); Salvato et al. (2012)). We focus on the talent of family members in the family firms and document that family members working in the family firm on average are more intelligent than non-family members. This hold both for employees and for CEOs, thus we reject that the talent gap is explained by family nepotism. Of course, we cannot rule out that other forms of nepotism is at play.

Our second conjecture is that family firms are less attractive and thus the supply of labor for family firms on average is of lower quality than for non-family firms. We address this in two ways. First, we regress the talent gap between family and non-family firms focusing entirely on periods with recessions. On average family firms are more resilient during recessions and thus hire more employees relative to non-family firms. Since the labor demand from non-family firms is down, we should observe more and higher quality labor applicants for open positions in family firms. However, we do not find a decrease in the talent gap during recessions. The second way we address this is by conducting a survey that we send out to all firms in Denmark about the experience they have during the 2020 COVID-19 crisis. We ask firms if they receive more applicants for their job openings and if the quality of the applicants are higher. We do not find support for the conjecture that family firms attract less talented applicants.

When family firms face the same quality of applicants, we suggest that it must be the way that family firms select their employees that causes the talent gap. This lead to our third conjecture, that family firms have worse management practice, which reduce talented incoming employees. Management practice has been shown to increase operational profit and other business outcomes. We suppose that good management practice also makes it easier to hire more talented employees at all levels. First, management practice makes an organization more transparent and secures that talented people can be

more easily recognized through performance measures. Second, good management practice always includes procedures for identifying and selecting talented applicants, while providing motivation and incentives for talented employees at the same time.

We have implemented a survey in 2015 which measured the management practice in 5,000 Danish firms, and we merge this with our sample of firms where we have IQ data for employees. We document that management practice positively correlates with having and hiring talented employees, managers and CEOs. We also confirm findings by Bloom and Van Reenen (2007); Bloom et al. (2010) that family firms have significant lower management practice. Thus, we find strong support for that the lower management practice in family firms is a driver for the talent gap between family and non-family firms.

Our documentation on (1) the existence of a talent gap in family firms versus non-family firms and (2) the management practice drivers for the talent gap extend the literature on management policy and family firms in important ways.

There is an existing literature on the personal traits and the identity of CEOs or owners in corporate governance (Bertrand and Schoar (2003); Malmendier and Tate (2009); Bennedsen et al. (2020)). We document that the identity of owners and managers in being a family have direct impact on labor composition, labor talent and hiring practices.

Second, an extensive literature documents how family firms and non-family firms differ in corporate policies and outcomes (see Anderson and Reeb (2003); Burkart et al. (2003); Bennedsen et al. (2007)). We contribute to this literature by documenting that one significant difference is the talent of their employees, managers and CEOs. Furthermore, we provide evidence for that this difference is driven by differences in management practices (Bloom and Van Reenen (2007); Bloom et al. (2010)). It also relates to a small number of studies which probes the trade-off between wages and job security in family firms (Ellul et al. (2018); Sraer and Thesmar (2007); Bach and Serrano-Velarde (2015)). These papers demonstrate that family firms provide better job security but pay lower wages. We also show that family firms pay lower wages but suggest an alternative

explanation, namely that the lower wages is correlated with lower employee talent.

Third, there is another stream of literature concerning talents' importance(Murphy et al. (1991)), their career preferences and talent management(Tarique and Schuler (2010). For instance, Asag-Gau and Van Dierendonck (2011) found that challenging working conditions and psychological empowerment can sometimes boost highly talented employees' commitment to organization.Tymon Jr et al. (2010) used India data to illustrate that firm intrinsic rewards, including social responsibility of the employer, pride in the organization, manager support, and performance management (PM) are crucial factors in retaining talents and promoting talents satisfaction towards firms. We are related to this branch of research by casting more lights on talents job preferences and factors which may determine their job selection result.

The rest of the paper is organized as follows. Section II describes data and provide evidence of the talent gap through summary statistic and cumulative distribution functions of IQ in family and non-family firms. Section III provides the main evidence for the talent gap. Section IV test if the talent gap is related to nepotism, labor demand and/or management practice. Section V concludes.

II Data and Summary Statistic

II.1 Data Sources

To analyze talent gaps between family and non-family firms we use the following data:

II.1.1 IQ data

Our preferred measure of employee talent is the individual IQ test taken from the military draft session. Every young male adult in Denmark has to go through the military draft session, typically at the age of 18. This session starts with a physical evaluation including elements such as height, weight, hair colour and many other things. After the

physical evaluation, the young males are presented with an intelligence test. This is a test developed five decades ago by a military psychologist named Børge Prinz. The test consists of 70 multiple choice questions. The result is measured on a scale from 0 to 70 and reflects the number of right answers the person has achieved. The military checks the validity of the tests with regular intervals and documents for instance that there is no moves in the distribution of results over time.

Before 2007 the military categorized all answers into 3-4 very broad bins focusing on those who were above or blow a minimum requirement for doing military service. Unfortunately, they destroyed the un-categorized data so detailed IQ data from the draft session only exist since 2007 and onward.

A natural objection to this measure is that some test takers who are unwilling to join military service may misrepresent their answers to achieve a very low score. The military controls the distribution of test answers by identifying unnatural patters and removing such data. Furthermore, the test is not decisive in determining whether a person do compulsory military service or not in reality, since 99 pct of the soldiers drafted today are voluntary. Thus they have no incentives to manipulate their test scores downwards, which make the average test score trustworthy. [1]

To be safe, we back up our preferred talent measure with estimated measures of personal ability from wage analysis of individuals that move jobs across firms. This approach also extends our talent data to include all women and all men, for those we do not have IQ data.

II.1.2 Firm Financial Information

Financial data are from Experian and the Statistical Business Register (SBR) at Statistics Denmark. Experian assembles the dataset from the financial statements and

[1] In addition, there may be a perceived cost of purposefully underscoring, since some may be worried that these test result could be used in the future for other purposes. However, at the present this would be i legal according to the Danish privacy protection laws.

management information of all limited liability firms in Denmark, which are required to file to the Ministry of Economics and Business Affairs. Firms are required to disclose the number of total assets, as well as the number of their operating and net income. Though most of the firms in Experian are privately held, external accountants still audit firm financial subjected to Danish corporate law. Critically for our purposes, Experian includes the unique firm-level identifier, the CVR number, issued by the Danish Commerce and Companies Agency, which serves as firm identifier in all interaction with the Danish authorities. The CVR numbers allow us to match Experian data with other data sources. We supplement Experian's financial information with revenue and employment information from the SBR, which is assembled by Statistics Denmark, a Danish government entity under the Ministry of Economic that is responsible for data collection and record keeping for a large number of economic variables. Furthermore, merging Experian and SBR data allows us to focus on those limited ability firms with actual employment and sales records, and exclude from the tests shell companies that are otherwise difficult to identify using Experian alone.

II.1.3 Management data

To identify the firms' CEOs, we rely on three data sources: (a) Experian, (b) Erhvervs- og Selskabsstyrelsen (ES), a dataset assembled by the Danish Commerce and Companies Agency, and (c) employment information from the "Integrated Database for Labour Market Research" (denoted IDA database) at Statistics Denmark. Experian reports the names of firms' top executives but does not contain individual identifiers. To be able to merge the names reported in Experian with other data sources, we use ES, which contains the Danish Personal Identification number (CPR) for all managers of limited liability firms. Under Danish corporate law, firms are required to file with ES any change in CEO positions within two weeks of its occurrence. Lastly, we use IDA to verify that CEOs are indeed registered as employees in the reporting firms.

II.1.4 Additional data

In the empirical exercises presented in the paper we define family firms from family involvement in the firm.

We obtain board membership information from Experian. We use this data to detect the presence of a board and to identify family firms as those in which at least three members of the board and management are related by blood or marriage. The definition of family firms vary across the literature[2]

We use IDA to identify non-CEO senior managers using a variable for an employee's position in the firm. We also use this dataset to identify new managers and those leaving the firm. IDA also contains information on age and education levels.

II.1.5 Sample Selection

We have firm level data for all limited liability firms, sole proprietorship, partnership, etc. Because of our interests in the talent gap between family and non-family firms, we restrict ourselves to firms with employees that are not that small, hence, we focus on limited liability firms. There are two types of limited liability firms: "aktieselskab" (A/S) and "anpartsselskab" (ApS). ApS corporations are smaller and likely to be informal in their organizational structure as they are not legally required to have a formal Board of Directors. We require that firms have at least one employee.

We retain firms which met all requirements for at least one year during 2000 to 2017, which is our sample period. In accordance with previous literature, we focus on non-financial, non-utility, and non-government-owned entities. We drop firms if they have been in different industries during sample period or if assets and employment data are

[2]In the Internet Appendix of Bennedsen et.al. 2021, there is a survey of 113 published papers that define family firms. The definitions vary widely across papers but all focus on the following five dimensions: nominal ownership, real ownership control, management involvement, number of family members involved and transition.

missing.

We require firms have a board with at least three members (the latter is a legal requirement of boards), which (1) secures the usage of board engagement in family firm definition, and (2) rules out the smallest firms which typically do not have a board.

Thus, our final sample consists of 35,269 unique firms over the time period of 2000 to 2017. We include firms which establish or stop during this period.

II.1.6 Summary Statistics

Table 1 shows firm-year summary statistics for all sample firms (Columns (1) and (2)), family firms (Columns (3) and (4)), non-family firms (Columns (5) and (6)), and t-test for differences in variable means across family and non-family firms (Column (7)). We have 317,267 firm-year observations in our sample (but not all variables have complete firm-year data). Almost 40 pct of our yearly firm observations origin from family firms and slightly more than 60 pct origins from non-family firms.

To assess firm performance in the absence of stock price information, we follow the literature in using operating return on assets (OROA). OROA is a natural proxy for performance, as it measures cash flows from operations divided by the value of assets, which can avoid distortion caused by capital structure decisions. The average OROA for family firms are 6.8 pct for family firms and 9.6 pct for non-family firms. The difference across groups is not statistically significant at conventional levels. Family firms are older than non-family firms and make less profit per employee even though they pay less wages per employee.

Our sample of firms consist mostly of middle sized non-listed Danish firms. The mean value of sales is 111,245 million Danish Kroner for family firms and 177,189 million DKK for non-family firms. Other measures of firm size, such as total assets or employment, also indicate that family firms are smaller than non-family firms. Table 1 highlights that our sample consists of small and medium sized firms. Since this is the most typical organizational structure in the world, we believe that our analysis is relevant far beyond

the institutional setting of a single country.

Firm age reveals that family firms are on average slightly older than non-family firms. The average family firm has been in business slightly more than 23 years whereas the mean age for non-family firms is one year less.

Table 2 Panel a and b provides summary statistic for all employees and for those employees for which we have IQ data at the employee-year level. The table provide data for all employees (in the sample) (Columns 1 and 2), managers (Columns 3 and 4), non-managers (Columns 5 and 6), CEOs (Columns 7 and 8), employees in family firms (Columns 9 and 10), employees in non-family firms (Columns 11 and 12) and a t-test for the differences of means between family and non-family firms.

The average level of wage(thous,$) for all employees in family firms is 48.05, and 52.27 in non-family firms, with a difference of -4.22. The average level of age for all employees in family firms is 39.61, and 39.10 in non-family firms, with a difference of 0.51.Both the differences of wage and age between family firms and non-family firms are statistically insignificant. The work experience for all employees in family firms is 16.99, and 16.54 for non-family firms. The difference is 0.45, which is statistically significant at 10% level.

Table 2 Panel c and d provides the same summary statistic as Panel a and b but now only for employees that are hired into the firm during our data sample years, which are called new-hires.

The average level of wage(thous,$) for all incoming employees in family firms is 32.20, and 34.71 in non-family firms, with a difference of -2.51. The average level of age for incoming employees in family firms is 32.33, and 31.75 in non-family firms, with a difference of 0.58. The work experience for incoming employees in family firms is 10.00, and 9.47 for non-family firms, with a difference of 0.53. Differences for wage, age and work experience are all statistically insignificant between family and non-family firms.

From both tables we notice that our sample of employees is large but not representa-

tive for the entire sample for two reasons: the military draft session is entirely for male only and we have very few observations for males above 48 years old. Thus, our IQ analysis below is based on young males but do not cover women and older men. Therefore, we will use an alternative talent estimation method (AKM) in the robustness analysis to verify that our IQ results are representative for women and older men.

III The talent gap in family firms

III.1 Distribution of talent in family and non-family firms

We begin this section with comparing the distribution of talent in family firms and non-family firms. It is important to highlight that all IQ results are based on our sample of young males in the age of 15-48 years.

Figure 1 plots the cumulative distribution function of the IQ of employees in family and non-family firms. The IQ is measured on a scale from 0 to 70 which reflect the number of correct answers in the underlying test. As is the case for the entire population of Danish male, we notice very few observations are scored below 30 or above 60. For a whole random selected population IQ is very close to being normally distributed. Thus, any deviation from the normal distribution must be due to selection.

The red line in Figure 1 depicts the cumulative distribution function for all young male employees in non-family firms. We see a clear normal distribution around a mean of 42.45 correct answers and a median very close to the mean. The blue line is the cumulative distribution function for IQ of the young male employees in family firms. We see that the CDF for family firms is to the left of the CDF for non-family firms. Thus, the mean of the family CDF is 41.13 or 1.32 points lower than non-family firms. Again since the distribution is normal, we observe that the median is almost the same as the mean. Hence, Figure 1 provides the first graphic illustration of the talent gap in family firms. For all levels of IQ, family firms have smaller shares of (young male) employees that are above that level than in non-family firms. We can prove the talent gap is large

by using a hypothetical experiment. If we hypothesize two (non-existing) representative firms with 100 employees each, we will have 50 employees above the median IQ level in family firms of 41.29. If we compare this IQ level to the distribution in non-family firms, we expect an additional 10 employees in non-family firms to have an IQ above 41.29.

We next ask if the talent gap also holds for those who have been employed by firms during our window of analysis. We define incoming employees as employees who enter firms during our data window from 2000 to 2017. Figure 2 panel (a) shows the cumulative distribution of all incoming employees in our firms (for which we have IQ data), with blue line representing family firms and the red line representing non-family firms. The mean IQ for incoming employees is 41.96 for non-family firms and 40.74 for family firms. We notice that the difference is only marginally smaller than all-employee-group. The talent gap in family firms is thus an important issue for the hiring of new employees.

There are more non-managers than managers in firms, thus it is relevant to ask if the talent gap holds for both groups. We answer this in Figure 2 panel (b) and (c), where we split the sample of newly hired into managers and non-mangers. For the newly hired managers in panel (b) we observe not surprisingly that the distribution of IQ is at a higher level than for the non-manager employees. The mean IQ for managers is 47.99 in non-family firms and 46.62 in family firms. Thus the talent gap is large for managers and on the same level as for all employees above. Panel (c) provide the cumulative IQ distribution for newly hired non-managers. The mean IQ is 41.52 for non-family firms and 40.55 for family firms. Thus, there is a significant talent gap in family firms both for newly hired managers and non-managers.

Finally, we ask if the talent gap between family and non-family firms also exist for the top management, the CEO of the firms. In Figure (2) panel (C) we thus provide the cumulative distribution function for the CEOs in our sample. We observe that the mean IQ is 45.20 in non-family firms and 43.29 in family firms. Thus, the mean difference is almost two IQ points, the biggest difference we have observed among the employee

groups.[3]

We conclude that Figure 1 and 2 have documented a significant talent gap between family and non-family firms. Obviously, these cumulative distribution functions are drawn for raw data and there are many co-founding factors that can explain part or all of this gap such if family firms have a different labor profile or a different profile in job categories. Thus, the next section will provide more robust evidence for the existence of a talent gap.

III.2 The talent gap: IQ differences

Above we have visualized the talent gap in raw data. In this subsection we provide further evidence for the size of the talent gap measured through differences in IQ levels.

Table 3 estimates the differences in IQ between employees of family and non-family firms. We use firm-occupation level data and add occupation, industry and year fixed effects. For all employees in Column (1) we observe that employees in family firms on average have almost 0.5 point lower IQ and the difference is statistically significant at all conventional levels. We then split the sample into two groups, namely managers in Column (2) and non-managers in Column (3). For both groups the talent gap remains almost the same, both in size and in statistically significance. Finally, Column (4) depict the talent gap for CEOs in family firms. We find an even larger IQ difference, with the average family CEO having a 0.7 pct lower IQ than the average non-family CEO. This difference is statistically significant at five pct level.

It is important to be precise on what the relationship depicted in Table 3 suggests. As such it is a correlation between firm-type and average IQ of employees. We do not claim that owner ship makes individuals more intelligent, nor that employee intelligence impact firm ownership. However, we will in the following provide evidence for a selection

[3]It is worth noticing, but outside the scope of this paper, that CEOs on average have lower IQ than the professional managers.

argument: That employees with lower IQ are selected more often into family firms than into non-family firms. There can be many potential drivers of this selection result and we will test some of these in Section 4.

Table 3 provide solid evidence for the existence of a talent gap in family firms and thus confirm the insight from our cumulative distribution figures above. On average, employees in family firms are less intelligent than employees in non-family firms. However, the value of talent depends on the job functions that employees are hired to do. Some job functions require higher ability, higher analytical skills and more responsibility involvement, whereas others may include mere standardized routines.

We investigate the existence of the talent gap across job categories. In particular we use our entire IQ population and divide jobs into three groups: Low IQ occupations are occupations where the average IQ of employees is below the 25 pct percentile; Mid IQ occupations are occupations where the average IQ is between the 25 pct and the 75 pct percentile; and high IQ occupations are occupations where the average IQ is above the 75 pct percentile. We show the IQ differences between family and non-family firms within each of these three job occupation groups in the raw data in Figure 3: The top figures shows that there is a mean differences of more than 1.5 points in favor of the non-family firms within the group of high IQ occupations. This difference is around 0.6 for the middle group and only 0.2 for the lowest IQ occupations.

These differences are confirmed in Table 4. We run regressions including level effects for the three occupation groups and interaction effects between occupation level and family firms. Column 1 includes year and industry fixed effects, whereas Column 2 only includes year fixed effects. The benchmark for the table is the talent gap in the low IQ occupations.

Panel a provides the estimation for the entire sample of employees where we have collapsed the sample at firm-occupation level. Notice, we observe a much smaller family firm coefficient, only one third of the coefficient from Table 3. This reflect that there is a much smaller talent gap for the low IQ occupations. On the other hand there are large

and statistically significant interaction effect for the middle and high IQ occupations.

In Table 5 we replace the sample of all employees with a sample of all incoming employees, defined as all employees which enter the firm in the period 2002 to 2017. To highlight that we identify correlations, we present simple mean differences in table 5. We find very similar results both with respect to the size of the talent gap and with its statistical significance. The one noteworthy difference is the talent gap for CEOs, which is more than double time larger than the incoming employees' talent gaps in entire population group.

We also notice that the mean differences across family firms and non-family firms within the three groups of occupations confirms our findings in Table 4. The talent gap is almost three time higher for the highest IQ occupations relative to the lowest IQ occupations.

This section has documented that there exist a large and significant talent gap in family firms. The talent gap is present across employee groups and is largest for CEOs. In general, the talent gap is higher and more significant in job categories that require higher talent.

III.3 The talent gap: Extension to female employees and above 48 male employees

The previous analysis is based on measures of IQ in the population of employees in private firms in Denmark. This method has one significant drawback. As discussed in Section 2, the IQ data origin from the military draft sessions in the period of 1997 to 2015. Because of this, the IQ measure only exist for male employee where most are below 48 years old. Hence, we are interested in if the talent gap is only for this group of employees or if it extends to female employees and male employees above 48 years old.

To answer this question we use evidence on talent derived from that many employees have moved between firms in our period of analysis. We can use changes in wage when individual moves across firms to extract a measure of talent. This was first done

by Abowd et al. (1999) and later has been a popular way to decompose individual effects from institutional effects (see for instance Finkelstein et al. (2016) and Bennedsen et al. (2019)). We follow Abowd et al. (1999) and use the mover analysis to decompose firm and personal fixed effects for wages. In this setting the personal fixed effects are estimated for the entire population of employees. In the labor literature, the personal fixed effects estimated through this procedure is often used as a measure of individual talent. Thus, the personal individual effects will be our proxy for talent. It is a more indirect measure than our IQ data but it has the advantages that we can estimate them for female employees and male employees above 48.

Table 7 provide estimates of personal fixed effects for the entire set of employees (Column 1) and the subgroups of managers (Column 2) non-managers (Column 3) and CEOs (Column 4). We are interested in if the personal fixed effect in general are lower in family firms than in non-family firms, thus, we add a family firm dummy. We notice that there is a large and statistically significant negative family firm dummy for the entire population, for the group of managers, the group of non-managers and for the group of CEOs. It is also worth remarking that the talent gap is economically higher for CEOs than for managers and non-managers.

Table 8 derives very similar results for the group of employees hired between 2002 and 2017(incoming employees).

Finally, we confirm the occupation results in Table 8. We split all occupations into high and low, where high refers to occupations which the average IQ of employis above the median IQ. We see a significantly negative family firm coefficient in both groups. However, it is around twice as large in the high IQ occupations. This is also confirmed in Panel (b) for the group of employees that are newly hired.

We summarize the findings in this section with that we have documented a significant talent gap between employees in family and non-family firms. The gap exists for managers, CEOs and non-managers respectively. Furthermore, through mover analysis we have shown it also exist for female employees and for male employees above 48 years

old, employees that were not covered in our IQ data.

IV Identifying drivers of the talent gap

Why do family firms hire less talented employees? We will in this section test three hypothesis that can explain the documented talent gap: First, we find evidence for that talent gap is related to differences in management practice between family and non-family firms. Second, we investigate if the talent gap is due to nepotism, that is the practice of hiring and promoting family members in family firms. We reject this hypothesis by documenting that family related employees have on average higher IQ than non-family related. Finally we also reject the hypothesis that the talent gap is caused by worse labor supply for family firms than non-family firms, that is the existence of a bias against seeking jobs in family firms.

IV.1 Inferior management practice

Our first hypothesis is that firms with better management practice are also able to attract more talented employees. If this is the case the talent gap in family firms could be at least partly explained from family firms having worse management practice. Management practice is a multidimensional term that origins back to McKinsey advising practice but has been popularized in economics with the seminal papers of Bloom etc. (**?**Bloom et al. (2010),). It covers practices such as measuring performance, incentives employees, use of data for decision making both strategically and in human resource a.o. We conjecture that leaders who use less data and less formalized decision strategies are also worse at identifying talent among job candidates.[4]

[4]Anecdotally, the authors of this paper are run family business centers in Asia, Europe and US. We often meet family business leaders emphasizing that hiring is more about relationships and gut feelings than about formal procedures. We have on all three continents met proud family leaders declaring they have never looked at a CV in their entire life.

Table 9 provides the first evidence for that family firms do not recognize talent to the same extent than non family firms. The model estimate real salary as the dependent variable and add IQ, family firm and the interaction effect between IQ and family firm as independent variable. In Column (1) we estimate this for all occupations. We notice that the interaction effect between family firms and IQ is negative and statistically significant at all levels. This illustrates that family firms in general reward IQ less than non-family firms. Furthermore, when we run the model for high IQ occupations (Column (2)), middle IQ occupations (Column (3)) and low IQ occupations (Column (4)), we see that the lack of monetary reword for IQ is driven by the high IQ group where we know the talent gap is highest. Thus, family firms are not recognizing highly intelligent employees in their salary structure.

To test more directly if the talent gap is driven by differences in management practice, we add results from a survey on management practice we did in 2015 with approximately 15,000 firms in Denmark. The survey followed closely the relevant questions in **?**Bloom et al. (2010). Based on this survey we follow the same procedures as **?**Bloom et al. (2010) and aggregate the survey answers to a score of management practice. We then add IQ data for employees in this firm and ask if the average IQ of employees is correlated with the level of management practice in the firm.

The results are presented in Table 10. Our survey is from 2015 so we run cross sectional regressions for the same year. In panel (a) the endogenous variable is the IQ of incoming employees in the years before the survey to two years after the survey, that is from 2013 to 2017. For all incoming employees we see that management score is positively correlated with the average IQ of newly hired employees and this effect is statistical significant at 10 pct level. In Column (2) we observe that the effect is four times higher for new managers group and this effect is statistical significant. The correlation between management practice and IQ for new non-managers is also positive, however, it is not statistical significant at conventional levels. Hence, we conclude that firms with better management scores do hire more talented employees.

In Panel (b) we test if the level of management practice is lower in family firms than in the non-family firms. We do this in a simple cross sectional model focusing on 2015, the year of we implemented the management practice survey. We observe a negative coefficient for our family firm dummy and that the effect is statistically very strong. Thus we confirm the evidence established earlier on large US corporations in **?**Bloom et al. (2010), that family firms have worse management practice than non-family firms.

This section has shown that family firms do not reward talent as much as non-family firms and the difference is highest for high IQ jobs. We have also shown that management practice are positively correlated with hiring more talented employees and that family firms on average have significant lower management practice than non-family firms. Taking together these three results are consistent with that the inferior management practice in family firms is one channel through which we can explain the talent gap.

IV.2 Nepotism

Our second hypothesis to explain the existence of the talent gap in family firm is nepotism. It is well known that family firms often hire family members instead of non-family members. And career path for non-family members may be limited due to the glass ceiling, that the top management positions are reserved to family members or their close friends.

We test this through comparing IQ of employees in family firms that are family related to the board. Since we define family firms as 3 members of the same family being in the board and/or top management, being family related to the board will in almost all cases mean being a member of the family behind the family business.

Figure 4 plots the cumulative distribution function of IQ for newly hired employees in family firms. The red line provides the distribution of IQ for employees that are not family related to the board and the blue line plots the distribution of IQ for employees that are family related to the board. Panel (a) shows the CDFs for all incoming employees, Panel (b) for all new managers, Panel (c) for new non-managers and Panel (d) for

newly hired CEOs.

From Panel (a) we see that the IQ distribution for family related employees are to the right of the IQ distribution of the non-related. Thus on average family members have higher IQ than non-family members. We see this difference is almost zero for non-managers but larger for managers. In Panel (d) we see that the difference is highest for CEOs, that family CEOs are more talented than non-family CEOs. Thus, since family related employees are on average more talented than non-family related, Figure 4 rejects the hypothesis that nepotism is an important channel to explain the talent gap in family firms.

The insight from Figure 4 is confirmed in Table 11. We run IQ test for all newly hired within family firms with adding occupation, industry, year and birth year fixed effects. The related to board coefficient is positive and large and statistical significant at all conventional levels. We also notice that the effect is more than double as large as family CEOs.

Given that we find family members on average have higher IQ and this holds in particular for family CEOs, we reject the hypothesis that the talent gap is coursed by nepotism.

IV.3 Difference in labor supply

Our third hypothesis is that there is a bias against family firms in the labor market. Talented employees would prefer to work in non-family firms when all else conditions equal.

We test this hypothesis by noticing that the family business literature has shown that family firms do better during crisis or they are more resilient. One often mentioned reason is that family firms are more conservative in financing and thus ends up being less leveraged. If family firms do better in crisis they should exploit this and hire better people during a crisis and thus the talent gap should be reduced or disappear during a

crisis.

In Table 12, we have collected the official OECD lists of years with economic crisis in Denmark and restrict our analysis to these year. We then replicate our standard IQ model for those years and split it up to all incoming employees (Column (1)), new managers (Column (2)), new non-managers (Column (3)) and new CEOs.

Comparing Table 12 with Table 3, we do not find any reduction in the talent gap for family firms during recession years. We therefore reject the difference in labor supply as a channel that explains the talent gap we have documented.

V Conclusion

Using IQ data from Danish military draft data we have documented a large and statistically significant talent gap in family firms. We also document that the gap is higher for positions where IQ is more important.

We linked the talent gap to management practice through showing that employee IQ is positively correlated with management practice and that family firms have significantly worse management practice. We also document that family members at all levels on average have higher IQ than non-family members and thus we reject the notion that the talent gap is caused by nepotism.

Thus, our paper provide evidence for that family leaders do not recognize talent. An interesting direction of future research is to estimate the productivity cost of the talent gap in family firms.

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Figure 1: IQ Distribution of All Employees

The plots present IQ distribution of all employees in family firms and non-family firms. The dashed line represents the mean IQ and the solid line represents the median IQ.

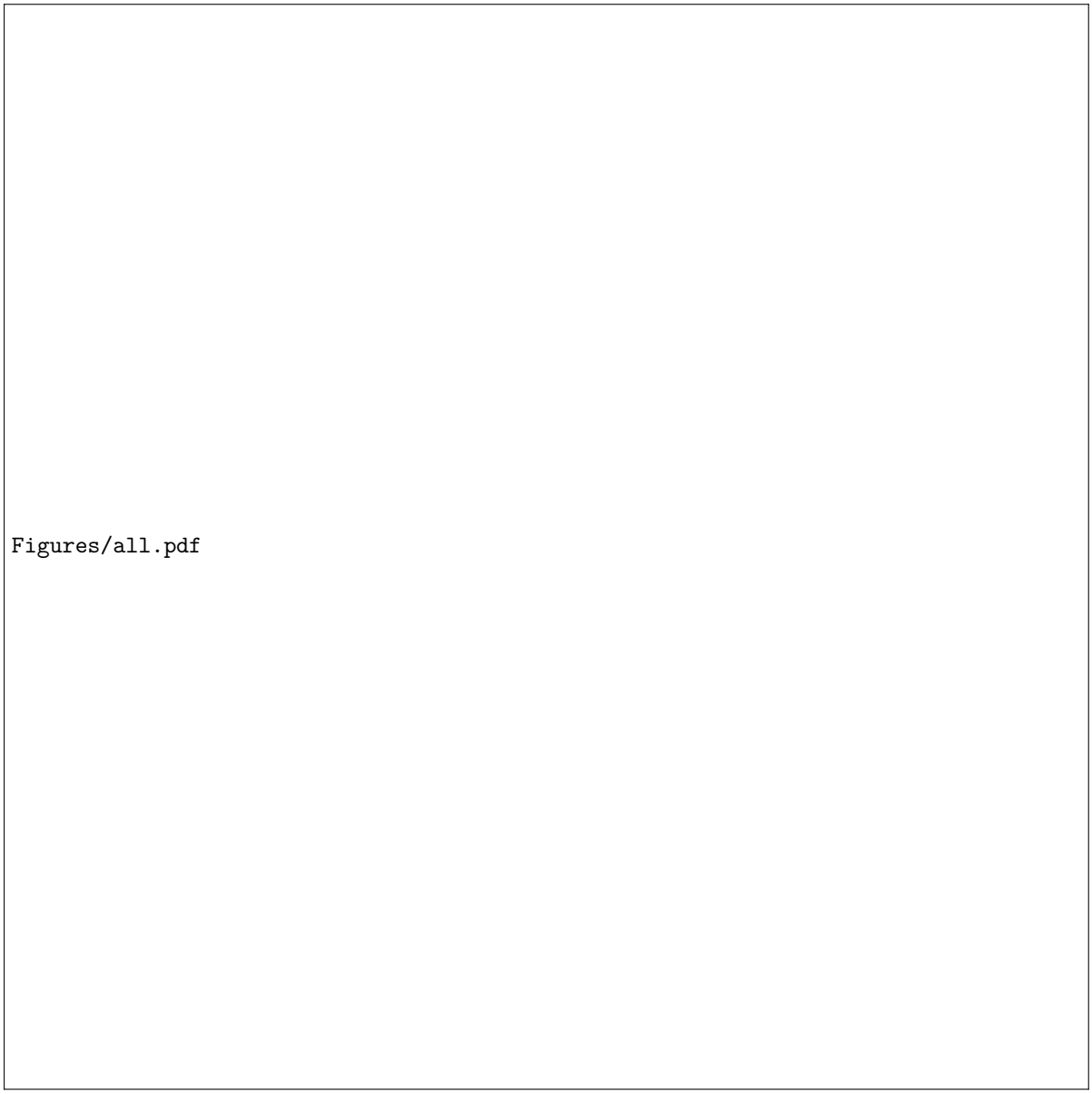
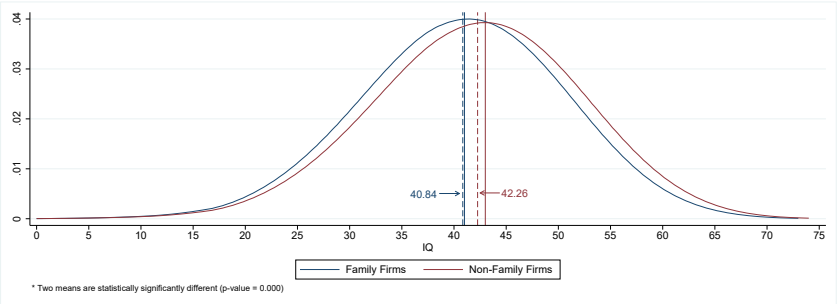
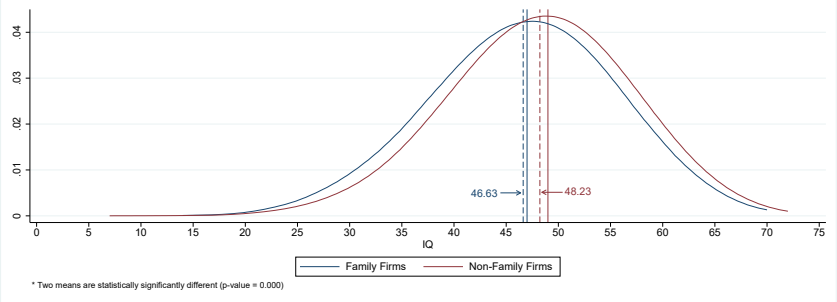


Figure 2: IQ Distribution of Incoming Employees

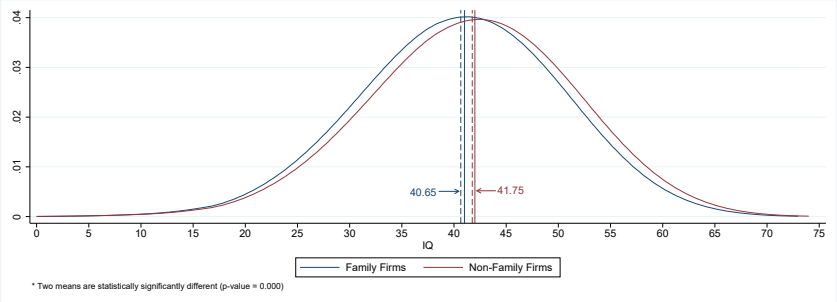
The plots present IQ distributions of incoming employees in family firms and non-family firms. Plot (a) takes the sample of all incoming employees, and plots (b) to (d) take the sample of new managers, new non-managers, and new CEOs, respectively. The dashed line represents the mean IQ and the solid line represents the median IQ.



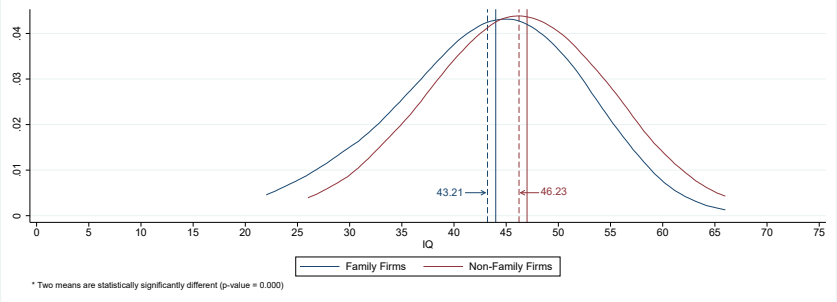
(a) IQ Distribution of All Incoming Employees



(b) IQ Distribution of New Managers



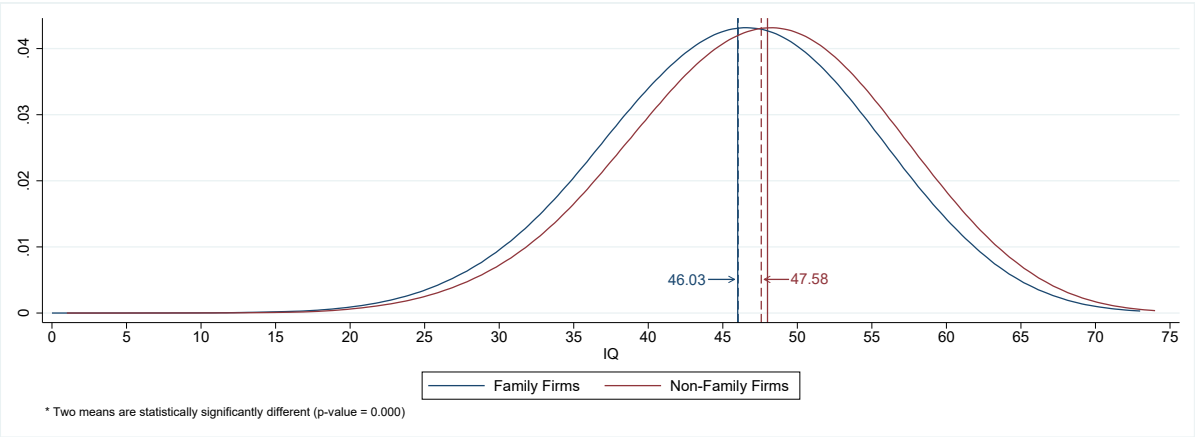
(c) IQ Distribution of New Non-Managers



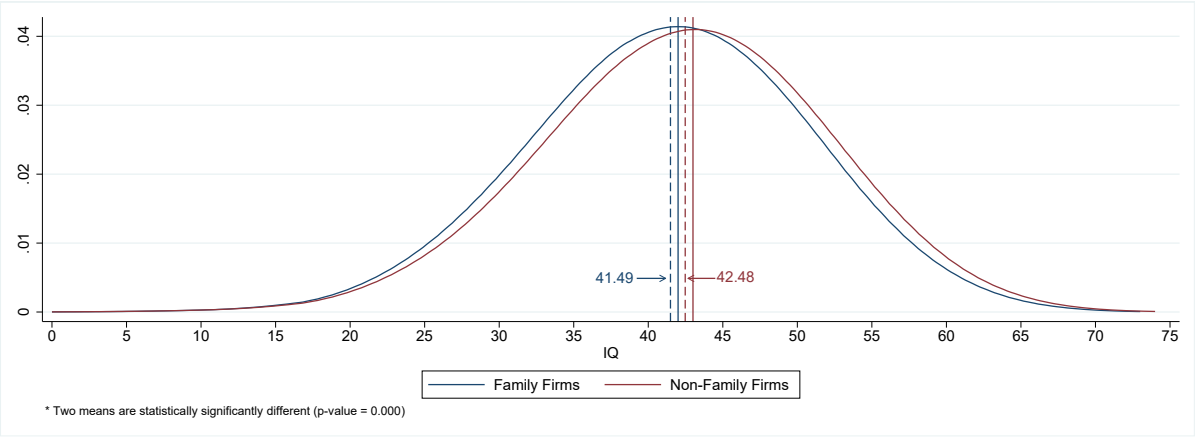
(d) IQ Distribution of New CEOs

Figure 3: IQ Distribution of Employees within Occupation Groups

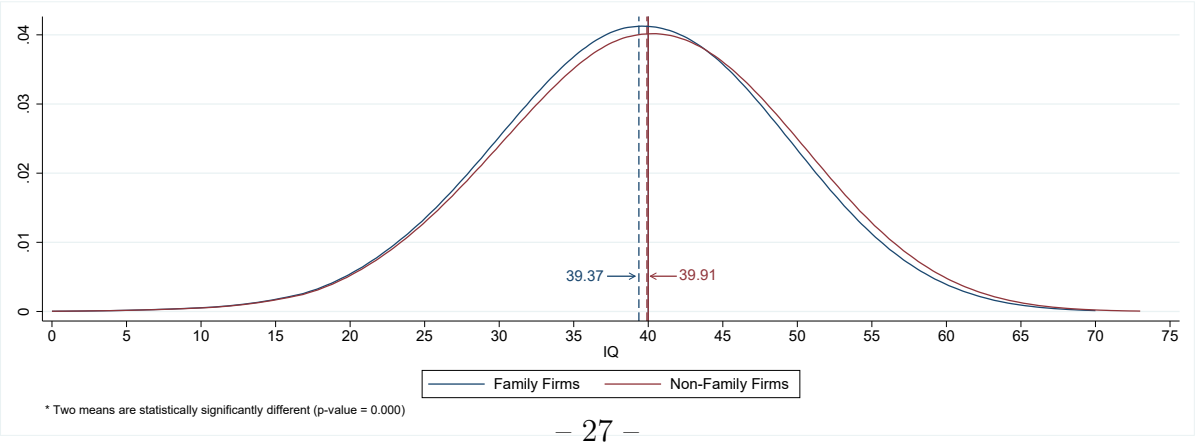
The plots present IQ distributions of employees based on whether they work in High IQ Occupation, Mid IQ Occupation, or Low IQ Occupation. High IQ Occupation. High IQ Occupation is an occupation whose average employee IQ falls in the top 25th percentile; Mid IQ Occupation is an occupation whose average employee IQ falls in between the 25th and 75th percentile; Low IQ Occupation is an occupation whose average employee IQ falls in the low 25th percentile.



(a) IQ Distribution of Employees in High IQ Occupations



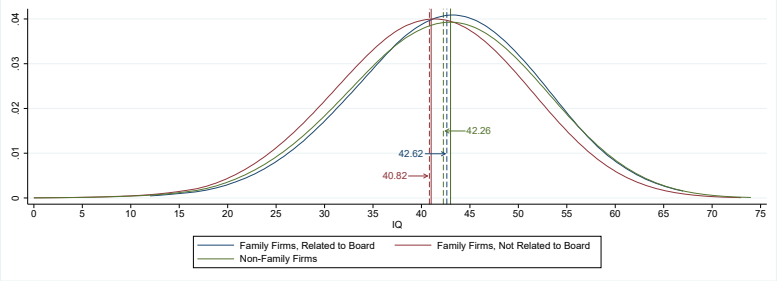
(b) IQ Distribution of Employees in Mid IQ Occupations



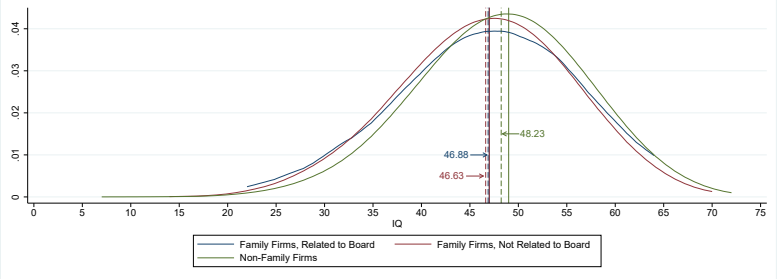
(c) IQ Distribution of Employees in Low IQ Occupations

Figure 4: IQ Distribution of Incoming Employees Related to Board

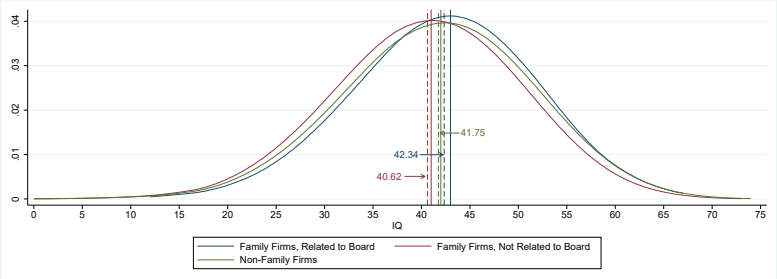
The plots compare the IQ distributions of incoming employees who are related to board in family firms, incoming employees who are not related to board in family firms, and incoming employees in non-family firms. Plot (a) takes the sample of all incoming employees, and plots (b) to (d) take the sample of new managers, new non-managers, and new CEOs, respectively. The dashed line represents the mean IQ and the solid line represents the median IQ.



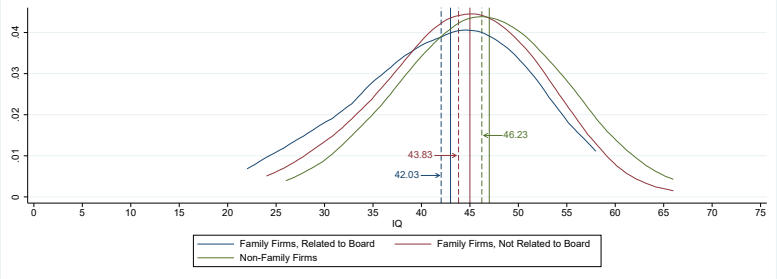
(a) IQ Distribution of All incoming employees within Family Firms



(b) IQ Distribution of New Managers within Family Firms



(c) IQ Distribution of New Non-Managers within Family Firms

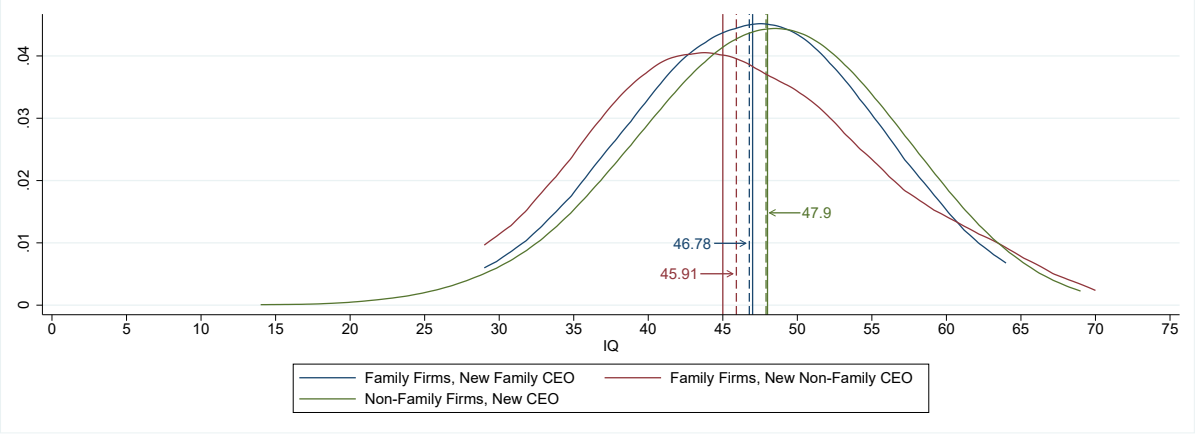


(d) IQ Distribution of New CEOs within Family Firms

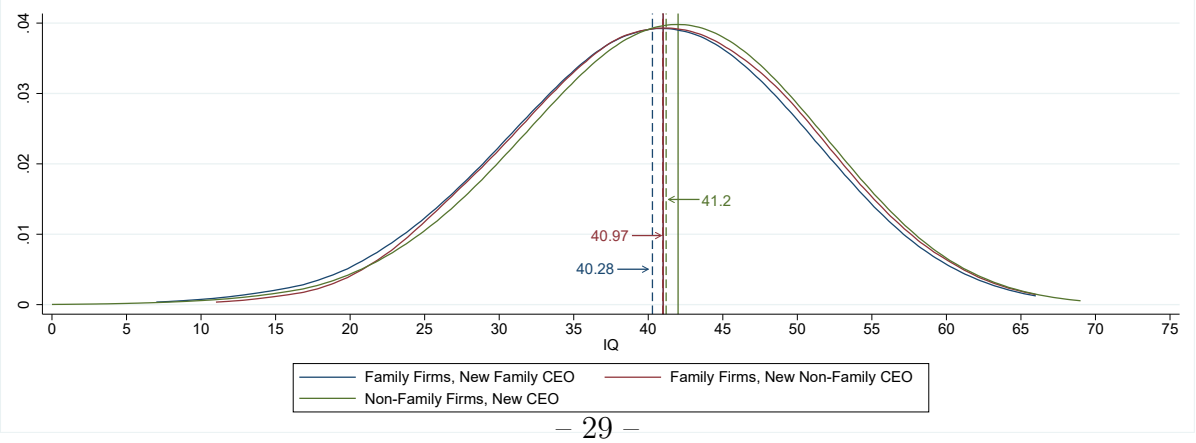
Figure 5: IQ Distribution of Incoming Employees After a New CEO is Hired

The plots compare IQ distributions of incoming employees who are hired after a new family CEO was introduced in family firms, incoming employees who are hired after a new non-family CEO was introduced in family firms, and incoming employees who are hired after a new CEO is introduced in non-family firms. The dashed line represents the mean IQ and the solid line represents the median IQ represents the median IQ.

(a) IQ Distribution of Incoming Employees



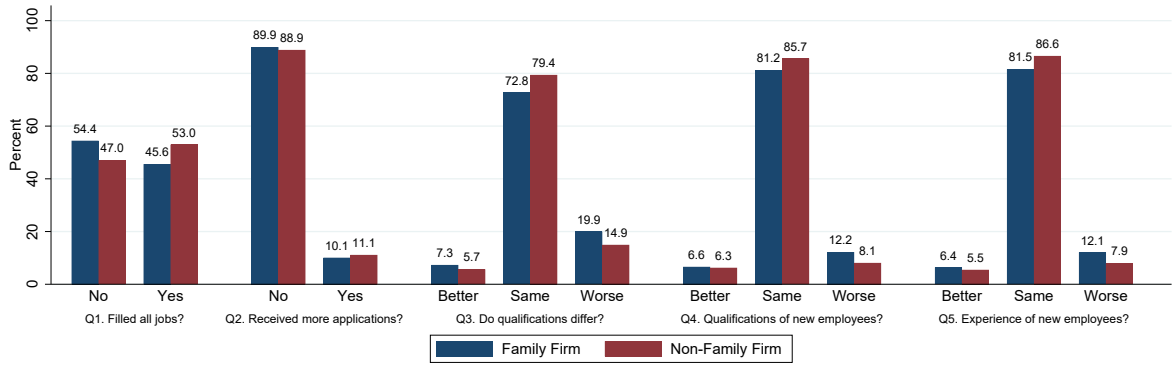
(b) IQ Distribution of New Managers



(c) IQ Distribution of New Non-Managers

Figure 6: Firm Type and Labor Supply

This summarizes the responses to the survey questions related to hiring employees during the COVID-19 crisis. Firms were asked the following five questions: (1) Did you fill all the jobs? (2) Did you receive more applications during the COVID-19 crisis than you did before the crisis? (3) Do qualifications of job applicants during the COVID-19 crisis differ from those before the crisis? (4) How are the qualifications of employees hired during the COVID-19 crisis different than compared to before the crisis? (5) How does the experience of employees hired during the COVID-19 crisis differ from those hired before the crisis?



Total 3,774 respondents
21.25% are family firms
Q1: 1,496 respondents, Q2: 1,496 respondents, Q3: 1,432 respondents, Q4: 1,439 respondents, Q5: 1,432 Respondents

Table 1: Firm-Year Level Summary Statistics

This table reports summary statistics for the firm-year level variables for all the firms in the sample and for family and non-family firms, respectively. Family firms are firms that are family controlled; that is, firms in which either two board members are related with the CEOby blood or marriage, or any three members are related (even if none of them is a CEO). Non-family firms are firms that are not family controlled. The table reports number of observations, unconditional means, standard errors in parentheses, and p-values of the mean differences between family and non-family firms. For the conversion from DKK to USD, we use the spot exchange rate at the year-end. Firm-year level variables are winsorized at 1%

	All		Family Firms		Non-Family Firms		t-test
	Observations	Mean	Observations	Mean	Observations	Mean	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Assets (mil. $)	290,011	0.45	112,013	0.14	177,998	0.64	0.000
		(20.652)		(5.255)		(26.028)	
Sales (mil. $)	297,773	0.95	114,937	0.34	182,836	1.32	0.000
		(32.779)		(7.281)		(41.427)	
Profits (mil. $)	327,385	0.67	125,651	0.20	201,734	0.96	0.007
		(37.448)		(2.557)	(47.661)		
Total Wages (mil. $)	258,662	1.68	99,158	0.90	159,504	2.15	0.000
		(7.759)		(2.778)		(9.604)	
Sales/Employee (mil. $)	297,773	0.025	114,937	0.018	182,836	0.030	0.000
		(0.356)		(0.213)	(0.422)		
Profits/Employee (mil. $)	327,385	0.011	125,651	0.010	201,734	0.011	0.000
		(0.041)		(0.037)		(0.044)	
Wage/Employee (mil. $)	258,662	0.039	99,158	0.037	159,504	0.041	0.000
		(0.028)		(0.018)		(0.033)	
Employment	327,392	38.05	125,654	21.04	201,738	48.64	0.000
		(294.339)		(62.489)		(371.313)	
Firm Age	327,392	23.03	125,654	24.10	201,738	22.36	0.000
		(21.941)		(20.795)		(22.558)	

Table 2: Employees: Summary Statistics (Employee-Year Level)

This table reports summary statistics for the employee-year level variables on the sample of all employees followed by employees' positions and family and non-family firms. Family firms are firms that are family controlled; that is, firms in which either two board members are related with the CEO by blood or marriage, or any three members are related (even if none of them is a CEO). Non-family firms are firms that are not family controlled. The table reports the number of observations, unconditional means, and p-values of the mean differences between family and non-family firms. For the conversion from DKK to USD, we use the spot exchange rate at the year-end.

Panel (a) All Employees	All		Family Firms		Non-Family Firms		t-test
	Obs	Mean	Obs	Mean	Obs	Mean	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Wage (thous. $)	1,780,782	45.92	475,234	44.10	1,305,548	46.58	
		(32.043)		(27.797)		(33.430)	
Age (years)	1,786,647	27.46	476,320	27.16	1,310,327	27.57	
		(7.025)		(6.835)		(7.090)	
IQ	1,786,647	42.25	476320	41.17	1,310,327	42.64	
		(8.526)		(8.273)		(8.582)	
Work Experience (years)	1,780,817	7.62	475,245	7.94	1,305,572	7.51	
		(6.564)		(6.450)		(6.601)	
Panel (b) Managers	All		Family Firms		Non-Family Firms		t-test
	Obs	Mean	Obs	Mean	Obs	Mean	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Wage (thous. $)	168,252	80.66	22,745	76.50	145,507	81.31	
		(44.312)		(44.913)		(44.182)	
Age (years)	168,624	33.01	22,770	33.20	145,854	32.98	
		(5.713)		(5.928)		(5.679)	
IQ	168,624	47.85	22,770	46.14	145,854	48.11	
		(7.628)		(7.746)		(7.575)	
Work Experience (years)	168,251	10.27	22,743	11.46	145,508	10.09	
		(6.372)		(6.810)		(6.281)	

Panel (c) Non-Managers	All		Family Firms		Non-Family Firms		t-test
	Obs	Mean	Obs	Mean	Obs	Mean	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Wage (thous. $)	1,612,530	42.30	452,489	42.47	1,160,041	42.23	
		(28.106)		(29.030)			
Age (years)	1,618,023	26.88	453,550	26.86	1,164,473	26.89	
		(6.896)		(6.736)		(6.957)	
IQ	1,618,023	41.67	453,550	40.92	1,164,473	41.96	
		(8.402)		(8.220)		(8.454)	
Work Experience (years)	1,612,566	7.35	452,502	7.76	1,160,064	7.19	
		(6.522)		(6.381)		(6.569)	
Panel (d) CEOs	All		Family Firms		Non-Family Firms		t-test
	Obs	Mean	Obs	Mean	Obs	Mean	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Wage (thous. $)	12,571	106.88	6,519	94.89	6,052	119.80	
		(82.925)		(68.240)	(94.588)		
Age (years)	12,618	36.47	6,545	36.33	6,073	36.62	
		(4.801)		(4.786)		(4.812)	
IQ	12,618	44.66	6,545	43.96	6,073	45.41	
		(7.554)		(7.620)		(7.408)	
Work Experience (years)	12,571	15.13	6,519	15.51	6,052	14.72	
		(6.191)		(5.973)		(6.392)	

Table 3: IQ Differences among Employees in Family Firms and Non-Family Firms

This table reports IQ differences among family firm employees and non-family firm employees. The sample of male employees is used since the IQ information is not available for female employees. In column (1), we collapse all male employees on firm-occupation level. In the rest of the columns, we collapse male managers (column (2)), male non-managers (column (3)), and male CEOs (column (4)) on firm-occupation-year level, respectively. $Family\ Firm$ is an indicator variable that takes one for family-controlled firms, and 0 otherwise. $ln(Asset)$, which is the log of firms' assets, measures firm sizes. We control for occupation, industry, and year fixed effects. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

	All	Non-Managers	Managers	CEOs
	(1)	(2)	(3)	(4)
Family Firm	-0.472***	-0.465***	-0.592***	-1.057***
	(0.050)	(0.050)	(0.144)	(0.332)
ln(Asset)	0.161***	0.138***	0.265***	0.741***
	(0.016)	(0.016)	(0.031)	(0.120)
Occupation FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.128	0.090	0.081	0.040
N	490,697	439,333	61,412	12,117

Table 4: IQ Differences of Employees Per Occupation Category

This table reports the IQ differences among family firm employees and non-family firm employees based on whether they work in high, mid, or low occupations. The sample of male employees is collapsed on firm-occupation-year level. Column (1) uses both year and industry fixed effects, and column (2) uses only year fixed effect. *Family Firm* is an indicator variable that takes one for family-controlled firms, and 0 otherwise. *HighIQOccupation* is an indicator variable that takes the value one for an occupation whose average employee IQ falls in the top twenty fifth percentile, and zero otherwise. *MidIQOccupation* is an indicator variable that takes the value one for an occupation whose average employee IQ falls in between the twenty fifth and seventy fifth percentile, and zero otherwise. *LowIQOccupation* is an indicator variable that takes the value one for an occupation whose average employee IQ falls in the bottom twenty fifth percentile. $ln(Asset)$ measures firm sizes. We control for year and industry fixed effects. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Family Firm	-0.329***	-0.231**
	(0.109)	(0.109)
High IQ Occ	7.578***	7.503***
	(0.092)	(0.091)
Mid IQ Occ	2.818***	2.751***
	(0.070)	(0.070)
Family Firm x High IQ Occ	-0.578***	-0.658***
	(0.167)	(0.166)
Family Firm x Mid IQ Occ	-0.459***	-0.496***
	(0.110)	(0.109)
ln(Asset)	0.289***	0.251***
	(0.015)	(0.016)
Year FE	Yes	Yes
Industry FE	No	Yes
R^2	0.086	0.089
N	490,706	490,706

Table 5: IQ Differences among Incoming Employees in Family Firms and Non-Family Firms

This table reports the IQ differences among incoming employees of family firms and non-family firms. All panels use the sample of incoming male employees. Panel (a) looks at these differences by each position. Panel (b) looks at these differences by four groups of firm sizes based on the average number of all employees throughout all years, where Group 1 is characterized by bottom twenty fifth percentile of firm sizes and Group 4 is characterized by top twenty fifth percentile of firm sizes. Panel (c) looks at these differences by the three occupation categories; High IQ Occupation for occupations whose average employee IQ is in the top twenty fifth percentile, Mid IQ Occupation for occupations whose average employee IQ is in between the twenty fifth and seventy fifth percentile, and Low IQ Occupation for occupations whose average employee IQ is in the bottom twenty fifth percentile. *Family Firm* is a dummy variable that takes 1 for family firms, and 0 for non-family firms. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Panel (a) By Position

	All	Non-Managers	Managers	CEOs
	(1)	(2)	(3)	(4)
Family Firm	-1.419***	-1.094***	-1.612***	-2.662***
	(0.109)	(0.086)	(0.353)	(0.652)
R^2	0.005	0.003	0.005	0.028
N	484,839	452,001	32,838	637

Panel (b) By Average Firm Size

	Group 1	Group 2	Group 3	Group 4
	(1)	(2)	(3)	(4)
Family Firm	-1.710***	-1.381***	-1.204***	-1.371***
	(0.203)	(0.137)	(0.099)	(0.139)
R^2	0.010	0.006	0.005	0.004
Number of Unique Firms	7,447	6,810	7,203	6,893
N	8,979	23,333	56,308	372,105

Panel (c) By Occupation Category

	High IQ Occ	Mid IQ Occ	Low IQ Occ
	(1)	(2)	(3)
Family Firm	-1.565***	-1.087***	-0.730***
	(0.233)	(0.100)	(0.155)
R^2	0.005	0.003	0.001
N	36,650	332,270	115,919

Table 6: All Employees: AKM Estimations

This table reports the results from AKM estimations on all employees. Panel (a) studies the link between total persons effect and family firms and uses the sample of all employees collapsed on firm-occupation-level. In column (1), the sample of all employees is used, and in columns (2) to (4), the sample of managers, non-managers, and CEOs are collapsed on firm-occupation-level, respectively. Panel (b) which studies the link between total firms effect and family firms and uses the sample of all employees collapsed on firm-level. *Family Firm* is an indicator variable that takes one for family-controlled firms, and 0 otherwise. $ln(Asset)$ measures firm sizes. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Panel (a) Total Persons Effect (Firm-Occupation-Year Level)

	All	Non-Managers	Managers	CEOs
	(1)	(2)	(3)	(4)
Family Firm	-0.0141***	-0.00137	-0.0734***	-0.143***
	(0.00256)	(0.00274)	(0.00409)	(0.00500)
ln(Asset)	0.0229***	0.0151***	0.0555***	0.194***
	(0.00119)	(0.00123)	(0.00179)	(0.00215)
Occupation FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.271	0.171	0.222	0.342
N	1,584,505	1,339,888	308,152	195,081

Panel (b) Total Firms Effect (Firm Level)

	All
	(1)
Family Firm	-0.0504***
	(0.00368)
ln(Asset)	0.0392***
	(0.00115)
Industry FE	Yes
Year FE	Yes
R^2	0.098
N	24,882

Table 7: Incoming Employees: AKM Estimation

This table reports the results from AKM estimations on incoming employees. Panel (a) studies the link between total persons effect and family firms and uses the sample of incoming employees. In column (1), the sample of all employees is used, and in columns (2) to (4), the sample of managers, non-managers, and CEOs are used, respectively. Panel (b) which studies the link between total firms effect and family firms and uses the sample of incoming employees collapsed on firm-level. $Family\ Firm$ is an indicator variable that takes one for family-controlled firms, and 0 otherwise. $ln(Asset)$ measures firm sizes. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Panel (a) Total Persons Effect (Individual Level)

	All	Non-Managers	Managers	CEOs
	(1)	(2)	(3)	(4)
Family Firm	-0.0158***	-0.0124**	-0.0831***	-0.133***
	(0.00468)	(0.00494)	(0.00856)	(0.0154)
ln(Asset)	0.00954***	0.00787***	0.0260***	0.222***
	(0.00214)	(0.00173)	(0.00340)	(0.00436)
Year FE	Yes	Yes	Yes	Yes
Birth Year FE	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	Yes
R^2	0.565	0.552	0.428	0.376
N	2,095,119	1,936,480	158,638	9,083

Panel (b) Total Firms Effect (Firm Level)

	All
	(1)
Family Firm	-0.0563***
	(0.00528)
ln(Asset)	0.0338***
	(0.00152)
Industry FE	Yes
R^2	0.052
N	24,662

Table 8: Male Employees Below 40: AKM Estimation

This table reports the results from AKM estimations on males below age 40. Panel (a) studies the link between total persons effect and family firms and uses the sample of all male employees below age 40 collapsed on firm-occupation-year level. In column (1), the full sample of all male employees below age 40 is used, and in columns (2) to (4), the sample of male managers, non-managers, and CEOs below age 40 are collapsed on firm-occupation-level, respectively. Panel (b) studies the link between total firms effect and family firms and uses the sample of male employee below age 40 collapsed on firm-level. *Family Firm* is an indicator variable that takes one for family-controlled firms, and 0 otherwise. $ln(Asset)$ measures firm sizes. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Panel (a) Total Persons Effect (Firm-Occupation-Year Level)

	All	Non-Managers	Managers	CEOs
	(1)	(2)	(3)	(4)
Family Firm	-0.0126***	-0.00925**	-0.0323***	-0.0735***
	(0.00333)	(0.00346)	(0.00626)	(0.00869)
ln(Asset)	0.0194***	0.0162***	0.0315***	0.163***
	(0.00152)	(0.00160)	(0.00191)	(0.00385)
Occupation FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.244	0.195	0.194	0.299
N	752,464	668,677	98,360	30,580

Panel (b) Total Firms Effect (Firm Level)

	All
	(1)
Family Firm	-0.0287***
	(0.00523)
ln(Asset)	0.0391***
	(0.00158)
Industry FE	Yes
R^2	0.059
N	24,023

Table 9: Real Wage and IQ of incoming employees in High/Mid/Low IQ Occupations

This table reports the effects of IQ and the type of firm on real wage of incoming employees. Column (1) uses the entire sample of incoming employees, and Columns (2) to Columns 4 use the sample of incoming employees who work for High IQ Occupations, Mid IQ Occupations, and Low IQ Occupations, respectively. *Family Firm* is an indicator variable that takes the value one for family-controlled firms, and zero otherwise. $ln(Asset)$ measures firm sizes. We control for occupation, industry, and year fixed effects. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

	All Occupations	High IQ Occupations	Mid IQ Occupations	Low IQ Occupations
	(1)	(2)	(3)	(4)
IQ	6.174	270.734***	-1.592	-77.480***
	(7.670)	(25.407)	(6.675)	(13.447)
Family Firm	775.769	1470.431	-68.178	-2083.251***
	(544.724)	(2699.158)	(516.137)	(790.163)
Family Firm*IQ	-37.085***	-83.368	-19.682*	42.815***
	(11.664)	(59.171)	(10.973)	(15.643)
ln(Asset)	287.690	1050.032***	134.564	491.605*
	(183.168)	(225.096)	(164.894)	(262.876)
Industry FE	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Birth Year FE	Yes	Yes	Yes	Yes
R^2	0.505	0.443	0.513	0.441
N	483,689	36,470	331,508	115,711

Table 10: Management Scores and Family Firms (2015)

Panel (a) reports the effect of better management practice on the IQs of incoming employees. Although the survey was taken in 2015, we assume that the management practice of firms stayed consistent in a five-year window: two years before and two years after 2015, or 2013 to 2017. We apply this window to Panel (a). Column (1) uses the sample of all incoming employees and columns (2) and (3) use samples of new managers and new non-managers, respectively. Panel (b) reports the difference in management scores among family firms and non-family firms in 2015 when the survey was taken, and the sample of all employees is collapsed on firm-level. *Family Firm* is a dummy that takes 1 for family firms and 0 for non-family firms. $ln(Asset)$ measures firm sizes and *Number of Employees* is a continuous variable for how many employees a firm had. We control for industry fixed effect in Panel (a), and we control for year, birth year, occupation, and industry fixed effects in Panel (b). Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Panel (a)

IQ and Management Score of Incoming Hires from 2013 to 2017

	All	New Non-Managers	New Managers
	(1)	(2)	(3)
Management Score	1.913*	1.397	7.250***
	(1.009)	(0.953)	(2.650)
ln(Asset)	0.160*	0.157**	0.0876
	(0.0834)	(0.0782)	(0.133)
Year FE	Yes	Yes	Yes
Birth Year FE	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R^2	0.130	0.087	0.124
N	15,576	14,310	1,435

Panel (b)

Management Score and Family Firms

	All Firms(2015)
	(1)
Family Firm	-0.041***
	(0.009)
ln(Asset)	0.033***
	(0.004)
Number of Employees	0.000
	(0.000)
Industry FE	Yes
R^2	0.206
N	1,084

Table 11: Incoming employees within Family Firms

This table reports the IQ differences among incoming employees based on whether they are related to board or not within family firms. Column (1) uses the sample of all incoming employees and columns (2) to (4) use samples of new managers, new non-managers, and new CEOs, respectively. *Related to board* is an indicator variable that takes the value one if an employee is related to any member of the board of the firm, and zero otherwise. We control for occupation, industry, year, and birth year fixed effects. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Panel (a) Individual Level

	All	Non-Managers	Managers	CEOs
	(1)	(2)	(3)	(4)
Related to Board	0.666***	0.696***	-0.445*	1.759
	(0.0616)	(0.0632)	(0.265)	(1.292)
ln(Asset)	-0.00688	-0.0251	0.248***	0.610
	(0.0275)	(0.0268)	(0.0824)	(0.409)
Occupation FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Birth Year FE	Yes	Yes	Yes	Yes
R^2	0.067	0.053	0.097	0.224
N	127,601	123,478	4,122	243

Panel (b) Firm-Occupation Level

	All	Non-Managers	Managers	CEOs
	(1)	(2)	(3)	(4)
Related to Board	0.780***	0.873***	-0.259	1.249
	(0.0116)	(0.120)	(0.370)	(1.309)
ln(Asset)	0.0785***	0.0590**	0.298***	0.626*
	(0.0289)	(0.0299)	(0.0840)	(0.372)
Occupation FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	Yes
R^2	0.079	0.057	0.081	0.043
N	41,959	39,946	2,662	231

Table 12: Incoming employees during Recessions

This table reports the IQ differences among incoming employees in family firms and non-family firms during recessions. We define a year as having experienced recession if it suffered from recession for more than 6 months of that year: 2001, 2002, 2007, 2008, 2012, and 2013. Column (1) uses the sample of all incoming employees and columns (2) to (4) use the sample of new managers, new non-managers, and new CEOs, respectively. *Family Firm* an indicator variable that takes the value of one for family-controlled firms, and zero otherwise. *Recession* is an indicator variable that takes the value of one for recession years, and zero otherwise. $ln(Asset)$ measures firm sizes. We control for occupation, industry, year, and birth year fixed effects. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

	All incoming employees	Non-Managers	Managers	CEOs
	(1)	(2)	(3)	(4)
Family Firm	-0.498***	-0.507***	-0.410**	-1.896**
	(0.0647)	(0.0652)	(0.204)	(0.758)
Recession	-0.0534	-0.0343	-0.306	-0.372
	(0.0736)	(0.0738)	(0.247)	(1.002)
ln(Asset)	0.0817***	0.0687***	0.120**	0.733***
	(0.0269)	(0.0246)	(0.0474)	(0.226)
Family Firm*Recession	-0.0409	-0.0388	-0.107	0.258
	(0.0632)	(0.0654)	(0.341)	(1.216)
Recession*ln(Asset)	0.0394***	0.0373***	0.0534	0.00992
	(0.0123)	(0.0121)	(0.0370)	(0.356)
Occupation FE	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Birth Year FE	Yes	Yes	Yes	Yes
R^2	0.084	0.053	0.098	0.115
N	588,689	552,339	36,348	779

Appendix

Table AI: Variable Definitions

Variable	**Definition**
Firm-level variables	
Family Firm	Indicator variable that takes the value of one if a firm is family-controlled; that is, if (1) two board members are related with the CEO by blood or marriage or (2) any three board members are related (even if none of them is a CEO); and zero otherwise.
Assets	The logarithm of assets. Assets are measured in real USD.
Management Score	
Employee-level variables	
IQ	IQ test result of Danish men from age of 18 to 40 who go through the military draft session. Ranges from 0 to 75.
High IQ Occupation	Indicator variable that takes the value of one if an occupation falls in the above twenty fifth percentile of the average employee IQ, and zero otherwise.
Mid IQ Occupation	Indicator variable that takes the value of one if an occupation falls in between the twenty fifth percentile and seventy fifth percentile of the average employee IQ, and zero otherwise.
Low IQ Occupation	Indicator variable that takes the value of one if an occupation falls in the bottom twenty fifth percentile of the average employee IQ, and zero otherwise.
Related to Board	Indicator variable that takes the value of one if an employee is related to anyone in the firm's board by blood, and zero otherwise.