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IN SUCCESSION DECISIONS AND PERFORMANCE

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ABSTRACT

This paper uses a unique dataset from Denmark to investigate the impact of family characteristics in corporate decision making and the consequences of these decisions on firm performance. We focus on the decision to appoint either a family or external chief executive officer (CEO). The paper uses variation in CEO succession decisions that result from the gender of a departing CEO's firstborn child. This is a plausible instrumental variable (IV), as male first-child firms are more likely to pass on control to a family CEO than are female first-child firms, but the gender of the first child is unlikely to affect firms' outcomes. We find that family successions have a large negative causal impact on firm performance: operating profitability on assets falls by at least four percentage points around CEO transitions. Our IV estimates are significantly larger than those obtained using ordinary least squares. Furthermore, we show that family-CEO underperformance is particularly large in fast-growing industries, industries with highly skilled labor force and relatively large firms. Overall, our empirical results demonstrate that professional, non-family CEOs provide extremely valuable services to the organizations they head.

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I. Introduction

Family firms have gained increasing attention in the economics and finance literature due to recent research showing that the majority of firms around the world are controlled by their founders or their founders' descendants [La Porta, López-de-Silanes, and Shleifer, 1999; Morck, Stangeland, and Yeung, 2000; Claessens, Fan, and Lang, 2000; Faccio and Lang, 2002]. Even in the United States, where firm ownership is widely dispersed [Berle and Means, 1932], founding families own and control at least one-third of large, publicly held firms [Anderson and Reeb, 2003].

One of the most contentious issues surrounding family firms relates to chief executive officer (CEO) succession decisions. CEO transitions are likely to play a key role in determining a firm's prospects and they are arguably influenced by the preferences of controlling families, which often struggle between hiring a family member or an unrelated CEO.

From a theoretical perspective, the impact of family CEOs on performance is ambiguous [Donnelley, 1964]. Family CEOs could perform better than other managers because they are exposed to higher non-monetary rewards associated with the firms' success that other CEOs do not share [Kandel and Lazear, 1992; Davis, Schoorman, and Donaldson, 1997]. They are also argued to have hard-to-obtain, firm-specific knowledge and higher levels of trust from key stakeholders [Donnelley, 1964]. Further, family managers could have a long-term focus that unrelated CEOs lack [Cadbury, 2000]. In contrast, family CEOs might underperform due to tensions between family and business objectives [Christiansen, 1953; Levinson, 1971; Barnes and Hershon, 1976; Lansberg, 1983] and, perhaps most importantly, due to the fact they are selected from a small pool of managerial talent [Burkart, Panunzi and Shleifer, 2003; Pérez-González, 2006].

The controversy has deepened in light of recent research that has shown large declines in firm performance around family CEO appointments [Pérez-González, 2006], leading to significant underperformance of heir-controlled firms, relative to those managed by unrelated CEOs [Morck et

al., 2000; Pérez-González, 2006; Villalonga and Amit, 2006].[1] Furthermore, the consequences of allocating assets to inferior managerial talent can potentially extend beyond family firms, hurting aggregate total factor productivity and economic growth [Morck et al., 2000; Caselli and Gennaioli, 2004; Bloom and Van Reenen, 2006].

An important concern with pre-existing studies on the impact of family or family-heir status on firm performance is that they rely either on pure cross-sectional variation in family-CEO status [Morck et al., 2000; Villalonga and Amit, 2006; Bloom and Van Reenen, 2006], or on changes in family-CEO status around management turnover [Pérez-González, 2006], both of which are unlikely to be random.[2] As a result, it has been difficult to establish whether family CEOs do indeed hurt firm performance.

The objective of this paper is to isolate the causal effect of family CEOs on firm performance. To this end, we use heterogeneity in the outgoing CEOs family characteristics as a plausible source of exogenous variation in management succession decisions.[3] To the best of our knowledge, this is the first paper that seeks to establish the causal effect of family CEOs on firm performance.

To assess this question empirically, we construct a dataset that contains accounting and management information for the universe of limited liability firms in Denmark. Our dataset is unique because we are able to link top managers in the sample to their family information in the official Danish Civil Registration System. These records contain information related to individuals' marital histories and children, which allow us to construct detailed CEOs' family trees.

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[1] Beyond the focus of family descendants, the impact of family firms on performance has been previously examined by Morck, Shleifer, and Vishny [1988], Yermack [1996], McConaughy, Walker, Henderson, and Mishra [1998], Anderson and Reeb [2003], and Adams, Almeida, and Ferreira [2005], among others, with mixed results.

[2] Family status and low performance ex-post could be explained, for example, by an endogenously determined board that is optimally weak relative to the CEO [Hermalin and Weisbach, 1998; Weisbach, 1988] and by mean-reversion. Alternative, omitted variables, such as, anti-takeover provisions [Gompers, Ishii, and Metrick, 2003] could explain both results.

[3] Our focus on the interaction between family characteristics and economic decisions relates to the seminal work of Becker [1981] and to the large body of work in economics that links the gender of offspring to various economic decisions [Angrist and Evans, 1998; Dahl and Moretti, 2004; and Bertrand, Johnson, Samphantharak and Schoar, 2005, among others].

Using this dataset we are able to replicate the difference-in-differences (DD) result that firms that promote a family CEO underperform relative to those that choose an unrelated CEO [Pérez-González, 2006]. Yet, as anticipated above, an important drawback of the least squares DD estimates is that they are subject to endogeneity and omitted variables problems. For example, even when family and unrelated CEOs are equally competent, the DD estimator might erroneously attribute differential improvements in investment opportunities to a gap in CEO abilities.

To overcome these concerns, we study the impact of family CEOs on firm performance using instrumental variables (IVs). We focus on variation in CEO succession decisions arising from heterogeneity in the outgoing CEO's family characteristics. As in Bertrand et al. [2005], we find that family size and marital history affect both the decision to appoint family CEOs, as well as which family member (child, spouse, etc.) is promoted. However, using these variables as instrumental variables is potentially problematic if these family characteristics respond to economic incentives [Becker, 1981].

Consequently, we instrument for family successions using a family trait that is likely to be randomly assigned: the gender of the firstborn child of a departing CEO.[4] The gender of the first child is a plausible instrument for family successions because it affects the probability of observing a family succession (primogeniture) and because it is unlikely to be correlated with firms' prospects. For departing CEOs in the sample, it is likely to be determined by nature: over 80 percent of first-child births occurred prior to 1980, before current techniques to identify the gender of children were widespread. Moreover, there is no evidence, that we are aware of, related to a "missing women" problem [Sen, 1992] in Denmark.

We show that the gender of the firstborn child of a departing CEO is strongly correlated with the decision to appoint a family CEO: the frequency of family transitions is 29.4 percent when

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[4] The paper also provides results for alternative instruments, such as the number of male children or the ratio of male to total children.

the firstborn child is female, and increases to 39 percent (a 32.7 percent increase) when the firstborn is male. This difference is statistically significant at the one-percent level.

To assess if the gender of the first child is likely to affect firm or family characteristics through channels other than the choice of succeeding CEOs, we compare firm and family traits for male first-child and female first-child firms at the time of CEO succession. We find that firms' profitability, age, and size do not differ statistically as a function of the gender of the first child. Moreover, the family characteristics of departing CEOs are comparable across groups: the number of children, spouses, and even the divorce rate are not significantly different for male first-child or female first-child firms. These results strengthen the case for the gender of the first child as a plausible instrumental variable for family CEO decisions.

Following the CEO turnover literature [Denis and Denis, 1995; Huson, Malatesta, and Parrino, 2004; Pérez-González, 2006], our main variable of interest is the change in operating return on assets (OROA) around CEO succession decisions. In assessing differential performance around CEO transitions, we adjust OROA using industry- and industry-and-performance-matched benchmarks to control for industry-wide trends and for potential mean-reversion in accounting variables [Barber and Lyon, 1996].

Our main finding is that family successions are significantly negatively correlated with firm performance around CEO successions. The relationship between family successions and firm performance is extremely strong and economically large: family CEOs cause an average decline in firm profitability on assets of at least four percentage points. Our IV results are significantly larger than those obtained using ordinary least squares (OLS), which might point to large biases in OLS estimates. Heir underperformance is robust to the inclusion of an array of controls for firm characteristics that have been found in the literature to affect firms' prospects around succession. Moreover, the results are not explained by mean-reversion in firm performance.

While the gender of the first child is likely to provide exogenous variation in terms of the identity of incoming CEOs, the timing of successions is unlikely to be random. We test for

differences in pre- and post-CEO transition changes in performance and we fail to find significant differences in performance across groups prior to CEO transitions. Also, we do not observe family-CEO firms recovering after CEO transitions, bolstering the case for the causal interpretation of our findings.

To further address potential concerns related to the timing of transitions, we instrument for family CEOs using the death of departing chief executives around succession as an instrument [Johnson, Magee, Nagarajan, and Newman, 1985]. Deaths provide likely exogenous variation in the timing of succession, yet they might raise concerns related to the exclusion restriction. Deaths can affect firms and families through channels other than the identity of a CEO replacement. We find that using deaths as an alternative instrument, however, leads to the same conclusion: family CEOs hurt firm profitability.

Another concern with the above-described results is that they might be explained by reported, but not real, differences in performance. Family CEOs might be more prone to divert firms' cash flows to the controlling family relative to unrelated CEOs, even when the core operating performance of the two groups of firms is identical. We test for this empirically by examining whether the results are explained by firms that lack a formal board of directors or by small firms, which presumably are more susceptible to such behavior. We show that this is not the case.

The superior performance of unrelated CEOs might instead be explained by changes in the governance structure of firms and not by managerial ability. That would occur if, for example, acquisitions accounted for a significant share of unrelated transitions. We show that family CEOs underperform relative to unrelated managers even when the departing CEO's family remains on the board of directors after transition.

We also examine whether industry characteristics that might be associated with differential costs of employing "professional," rather than family CEOs, affect our findings. We find that family CEOs tend to be costlier in fast-growing industries, as well as in industries with high

relative wages or highly skilled labor forces, environments where managerial skills are presumably more valuable. Conversely, we do not find a statistically significant gap in performance for firms that promote family CEOs in industries where family succession concentration is high relative to the sample. Failing to find significant differences in performance in this latter group might also help to explain the gap between OLS and IV estimates. The latter estimates are calculated on firms that promote a family CEO due to the gender of the first child. By *randomly* selecting family CEOs, the IV would under-represent those industries where family CEOs are normally present.

We also investigate the impact of family CEOs on alternative measures of performance. Specifically, we assess the effect of family CEOs on firms' return on assets (ROA), return on capital employed (ROCE), total assets, as well as on the likelihood of bankruptcy and liquidation. ROA and ROCE results underscore the negative impact of family CEOs on firm performance. Further, we fail to find support for the notion that family CEOs engage in significantly larger investments relative to unrelated CEOs. Finally, we show that family CEOs are not associated with lower rates of bankruptcy or liquidation as would be expected if the lower return generated by family CEOs were the result of a conservative management style. In contrast, and consistent with family CEOs underperformance, we find that relatively less profitable firms that are managed by family CEOs are more likely to file for bankruptcy or be liquidated, relative to comparable firms that are headed by non-family CEOs.

A common caveat in interpreting IV estimates is that not every firm in the sample responds to the instrument, and as such, the results might only be representative of those firms whose succession decisions are affected by it [Imbens and Angrist, 1994]. We assess whether the gap in CEO skills between family and unrelated CEOs is significantly different for the average, relative to the marginal, family CEOs by comparing the OLS and IV estimates of the differences in previous job qualifications or educational records for family and unrelated CEOs. We find no statistically significant differences between OLS and IV estimates. In contrast, and in line with the overall

results of the paper, we find that unrelated CEOs are significantly more qualified than family CEOs: they are more likely to be seasoned CEOs and more likely to have attended college.

An alternative way to interpret our analysis is that it provides a clean test of the direct effect of professional CEOs on firm performance. An ideal laboratory to test professional CEOs' worth would be to randomly assign individuals from the general population and professional managers to the CEO position, and then compare their outcomes. This is close to what the IV estimator does: it compares the performance of firms with an unrelated CEO to the performance of firms that promote a family member only because the departing CEO's firstborn child was male. If unrelated CEOs were valuable, then the performance of the former firms should exceed the latter, which is indeed what we find. Professional CEOs seem to provide extremely valuable services to the organizations they head.

Overall, our results cast doubt on the benefits of promoting a CEO from within the ranks of the controlling family of a corporation. These findings are important for the governance of both public and private firms around the world. Controlling families that enjoy the private benefits of control might select a family CEO even when performance is negatively affected as a result. Other stakeholders, from minority shareholders to creditors or workers, might not share in these benefits and would therefore be negatively affected by family successions.

The rest of the paper is as follows. Section II describes the data and presents summary statistics; Section III outlines our empirical strategy; Section IV presents the results of the paper; and Section V concludes.

II. DATA DESCRIPTION AND SUMMARY STATISTICS

II.A. Data Sources

We construct a dataset with 5,334 successions between 1994 and 2002 in limited liability (publicly and privately held) firms in Denmark. Our dataset contains financial information on

firms, as well as personal and family information about departing and incoming CEOs. The dataset was constructed based on three different sources, as explained below.

1. Financial and management information are from *Købmandsstandens Oplysningsbureau* (KOB). KOB is a dataset assembled by a private firm using the annual reports that all limited liability firms are required to file at the Danish Ministry of Economic and Business Affairs. The dataset contains selected accounting and management information on the universe of limited liability companies in Denmark. Local regulations only mandate disclosure of firms' assets and measures of firm profitability, such as operating or net income. The disclosure of alternative firm-level attributes, such as sales or employment, is not required, although some firms do selectively report them. Management data, which all firms are required to report, include the names and position of executives and board members.

We obtained access to management information from 1994 to 2002, and financial data from 1991 to 2003. Even though a large fraction of KOB firms are privately held, KOB data are likely to be reliable, as Danish corporate law requires annual reports to be approved by external accountants. Given our focus on changes in firm performance around CEO transitions, for our analysis, we only require that reporting biases are consistent at the firm level.

2. Individual and family data about departing and incoming CEOs are from the official Danish Civil Registration System. These records include the personal identification number (CPR), name, gender, and dates of birth and death of all Danish citizens. In addition, these records contain the names and CPR numbers of parents, siblings, and children, as well as the individual's marital history (number of marriages, divorces, and widowhoods). We use these data to construct CEOs' family trees and to identify whether departing and incoming CEOs are related by blood or marriage.

3. To match the names of top management reported in KOB with their CPR numbers, which are needed to access their individual and family information in the Danish Civil Registration System, we use a database from the Danish Commerce and Companies Agency (*Erhvervs- og*

Selskabsstyrelsen, or ES), at the Ministry of Economic and Business Affairs. The ES dataset reports both the names and CPR numbers of management and board members of all limited liability corporations. Under Danish corporate law, firms are required to file with ES any change in CEO or board positions within two weeks of the actual date of occurrence.

Firm by firm, we match the name of the CEO reported in KOB with the name reported in the ES dataset. For all these matches, we use the CPR number from ES to obtain family information from the official Danish Civil Registration System. Based on this procedure, we match around 90 percent of all managers involved in CEO transitions. In addition, despite the fact that women often drop their maiden names after marriage, we are able to match men and women equally well. We do it by using women's family trees to reconstruct their maiden names, as well as other names they had in previous marriages. In the paper, we classify an incoming CEO as "family" whenever official records indicate that the incoming and the departing CEOs are related by blood or marriage.

We report a CEO succession when four conditions are met: First, based on data from KOB, the departing (entering) CEO had been (stayed) in his/her position for at least two years. Second, CEO names were matched to their relevant CPR number using the ES dataset. Third, we required that matching financial information from KOB was available around CEO transitions and that firm employment, where available, was not zero. Fourth, we retained the first CEO transition per firm.

II.B. Firm Characteristics

Table I presents summary statistics of the firms in the sample both as a group (Column I) and classified by the family links between the departing and incoming CEOs. *Family* (Column II) indicates the incoming CEO is related by blood or marriage to the departing CEO and *unrelated* (Column III) indicates otherwise.

The first row in Table I shows the natural logarithm of total assets for the firms in the sample. Not surprisingly, firms that undergo family successions are relatively smaller than those

that select unrelated CEOs. On average, family succession firms had 2000 Danish Kroner (DKR) 11.2 million or US$1.4 million in assets.[5] In contrast, firms that selected unrelated CEOs had, on average, DKR 64.4 million or US$8.0 million in assets. The difference in firm size is significant at the one-percent level.

Given that regulations only mandate disclosure of firms' assets and measures of profitability such as operating and net income, in Table I we scale operating and net income using the book value of assets in order to present comparable measures of firm performance at the time of CEO transitions.

Operating return on assets (OROA) is measured as the ratio of earnings before interest and taxes (EBIT) to the book value of assets. OROA is a natural measure of performance that has been previously used in the CEO turnover literature to assess if firms operations change around successions [Denis and Denis, 1995; Huson, Malatesta, and Parrino, 2004; Pérez-González, 2006]. It compares a comprehensive proxy of firms' cash flows (EBIT) to the total asset base used to generate them. Unlike net income-based measures, such as return on assets, it is unaffected by differences in the firms' capital structure decisions. In contrast to return on equity or return on capital employed, it compares firm performance relative to total assets, not only, a fraction of them. Average OROA is 6.5 percent for all firms in the sample. Splitting firms by the family links of the departing CEO, we find that firms that experience family successions are, on average, more profitable than those firms that promote unrelated CEOs: 7.4 and 6.1 percent, respectively; the difference of 1.3 percentage points is significant at the one-percent level.

In Table I we also present the ratio of net income to assets, calculated using after-tax profits relative to the book value of assets. The average net income to assets is 3.3 percent and, as before, family-CEO firms are more profitable than unrelated-CEO firms at the time of succession. The difference is 0.7 percent, significant at the 10-percent level.

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[5] The average exchange rate in 2000 was equivalent to 8.08 Kroner per U.S. dollar (*World Development Indicators*).

Table I also reports industry-adjusted measures of OROA. Industry controls are calculated using equally weighted averages of all active firms, including those that do not experience a CEO transition. For each industry, we require that at least 20 non-event firms exist in any given year. We favor four-digit industry (NACE, European industry classification system) controls, and move to two-digits if the 20-firm restriction is not satisfied with four- or three-digit groupings.

Industry-adjusted OROA shows that the difference in profitability for family- and unrelated-CEO firms is not driven by industry characteristics: the difference is 1.4 percentage points, comparable to the difference obtained using unadjusted OROA. Finally, Table I shows that firms in the sample do not systematically differ as a function of age.

Overall, Table I shows that family successions are likely to occur in relatively smaller and more profitable firms. The marked difference between these firms and those that promote unrelated CEOs indicates that CEO succession decisions might not be random. As a result, it is not obvious that family or unrelated CEOs are a fair counterfactual for each other observed succession. Moreover, to the best of our knowledge, we are the first to provide a comprehensive view of family CEO successions in an economy, as prior work has focused on analyzing the characteristics of these firms using data from publicly traded corporations [for example, Morck et al., 2000; Pérez-González, 2006; Villalonga and Amit, 2006].

II.C. Family Characteristics and CEO Succession Decisions

In Table II we explore the correlation between family characteristics and the choice of incoming CEO. We present the number and share of CEO transitions when classified as family (Columns II and III) or unrelated (Columns IV and V) successions. We further breakdown family successions into *family—children* transitions, when the incoming CEO is the child of the departing CEO (Columns VI and VII), and *family—others,* when the incoming CEO is related, but not an offspring of the outgoing CEO (Columns VIII and IX).

Family successions occur in 1,776 out of 5,334 CEO successions (33.3 percent). Column VI shows that 863 family transitions (48.6 percent) involve the children of the departing CEO. Given that firms in our dataset are mostly privately held, the fraction of family transitions might appear low. However, according to La Porta, López-de-Silanes, Shleifer, and Vishny [1998], Denmark is among the highest-ranked countries in terms of "rule of law" (10 out of 10 in their measure), which might reduce the expropriation potential by unrelated CEOs and diminish the relative attractiveness of family CEOs [Burkart et al., 2003].

In Table II Panel A, we document that the marital history of CEOs can potentially affect both the choice of family or unrelated CEOs and whether children are chosen for the CEO position. We show that family successions are less common in firms in which the outgoing CEO has no spouse than in firms in which they have exactly one spouse. This could simply reflect the fact that the pool of potential family candidates is larger when the outgoing CEO has a spouse. More interestingly, the frequency of family transitions decreases for CEOs that, at the time of succession, have had more than one spouse. For this group, it is 10.7 percentage points, or 29.7 percent lower than in the case of firms in which the departing CEO has had only one spouse, a difference that is significant at the one-percent level. Panel A also shows that this difference is explained by a reduction in the frequency with which children gain the top post (Column VII), and not by the change in the probability that other family members get promoted (Column IX).

In Panel B we show the frequency of family successions as a function of the number of children of the departing CEO. We find that the frequency of family successions increases with the number of children. It rises from 29.1 percent for departing executives with one child to 41.3 percent for those with three children. The associated difference of 12.2 percentage points is significant at the one-percent level and it represents an increase in the probability of a family transition of 41.9 percent. In addition, we find that the rate of increase in family successions falls with the number of children. Specifically, moving from three to four children does not increase the share of family transitions.

Family firms seem to exhibit a preference for children over spouses, parents, or siblings at the time of succession. In Table II Panel B, we observe that firms in which the departing CEO has one child appointed a child CEO in 11.9 percent of the successions. By construction, this ratio was zero when departing CEOs have no children. Interestingly, part of this increase comes at the expense of non-children relatives. When we compare the share of non-children family CEOs for one- and no-children departing CEOs, we observe that the frequency with which other family members are promoted to the CEO position decreases by 7.5 percentage points with the first child; this decline is significant at the one-percent level. This evidence suggests that children crowd out other members of the family.

In Table II Panel C, we explore the correlation between the ratio of male to total number of children and succession decisions. We report that firms in which more than 50 percent of the outgoing CEO's children are male are 10.8 percentage points more likely to have a family successor than firms in which less than half of the children are male; the difference is significant at the one-percent level.

Although Panels A, B, and C show interesting and strong correlations between family characteristics and the probability of family successions, it is difficult to assert causality. The correlation between the number of children and family CEOs might be explained, for example, by omitted variables such as the departing CEO's preference for a large and close family. Of the family characteristics described above, an attractive feature of the gender ratio is that it is partly exogenous: departing CEOs are unlikely to control the gender of a given child. The ratio is, however, endogenous because individuals can affect its variance through their choice of family size: it would tend to converge to 50 percent as the number of children increases.

II.D. The Gender of the Firstborn Child

To explore whether family characteristics might have a causal impact on the probability of family succession, we report in Table II Panel D the correlation between the decision to promote a

family CEO and a family trait that is likely to be random: the gender of the firstborn child of a departing CEO. For departing CEOs in the sample, the gender of the firstborn child is likely to be determined by nature, as over 80 percent of them had their first child prior to 1980, before techniques to identify the gender of children were widespread.

Table II Panel D shows that outgoing executives whose firstborn child is male are 9.6 percentage points more likely to be succeeded by a family member than their counterparts whose firstborn child is female; the difference is significant at the one-percent level. Moreover, Column VII shows that this difference is driven by changes in the probability of children of the outgoing executive getting the top position. Interestingly, Column IX shows that the gender of the first child does not affect the frequency with which other relatives get the CEO position.

These correlations are consistent with anecdotal evidence that male children are preferred to females at the time of succession. The magnitude of the difference (32.7 percent) might appear large given that Denmark is a country with a high overall level of gender equality (it ranks fourth among 58 countries surveyed by the World Economic Forum) and one of the highest female labor force participation rates in the world.[6] Nevertheless, these numbers are consistent with the low levels of female participation among top management positions in Denmark. In 2004, the fraction of women among top managers was only 25 percent, compared with 61 percent in intermediate-level positions.[7]

Having shown that a family trait that is arguably exogenous affects the decision to name a family CEO, we now turn to describing our empirical strategy to investigate the consequences of family CEOs on firm performance.

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[6] See http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/gender_gap.pdf for statistics on gender inequality and 2001 Statistical Yearbook published by Statistics Denmark for cross-country comparison on women's labor force participation.
[7] See http://www.dst.dk/HomeUK/Statistics/ofs/Publications/Yearbook (Table 136).

III. A. Empirical Specifications

A simple way to evaluate the impact of family CEOs on firm performance is to estimate the difference in firm profitability around CEO successions and assess the way in which firm outcomes change as a result of management transitions. This difference is attractive because it provides an estimate of the impact of CEOs on performance that is not affected by firms' time-invariant characteristics. However, a concern with this approach is that it can fail to control for aggregate changes in performance due to, for example, industry or aggregate trends, succession-specific shocks, or mean-reversion in performance measures.

Common solutions to this problem include adjusting the measures of profitability using industry or industry-and-performance benchmarks [Barber and Lyon, 1996] and using a difference-in-differences (DD) analysis, relative to a control group. In this case, we compare the changes in performance of firms that name a family member to the CEO position to that of firms that experience a succession by an unrelated CEO, as described by the following equation:

$$y_i = a_1 + X_i' b_1 + c_1 \, famCEO_i + \varepsilon_{1i},\qquad(1)$$

where y_i is the difference in performance around CEO transitions. $famCEO_i$ is an indicator variable equal to one if the incoming CEO is family and zero if unrelated. Under the null that all CEOs are equally talented, c_1 would not be different from zero.

A fundamental shortcoming of implementing a DD analysis is that it requires that the *program* to be evaluated not be implemented based on differences in outcomes. In our setting, this requirement implies that CEO decisions are uncorrelated with determinants of firm performance. This assumption is challenging, as succession decisions are likely to incorporate firms' prospects.

We use IVs to overcome this problem. The main advantage of using IVs is that we are explicit about the source of variation used to evaluate the relative impact of family and unrelated

CEOs. In this paper, we use the gender of the first child to instrument for whether a new CEO is a family CEO or unrelated. Because this variation is arguably orthogonal to firms' prospects, it mitigates concerns about the causal interpretation of the results.

However, a drawback of IV estimation is that it is only based on the subset of firms that are affected by the instrument. Specifically, the IV estimates the effect of family CEOs on the subset of firms that appoint a family CEO when the gender of the first child is male, but an unrelated CEO when the gender of the first child is female. If the effect of family CEOs is not constant across firms, then the IV only estimates the average effect of family managers on the set of firms that respond to the instrument [Imbens and Angrist, 1994].

To implement the IV estimator, we first run the following regression (first stage):

$$famCEO_i = a_{2i} + X_i^{'}b_2 + c_2 \, genderfirst + \varepsilon_{2i} \, , \tag{2}$$

where $famCEO_i$ is an indicator variable equal to one if the incoming CEO is related by blood or marriage to the departing CEO and zero otherwise. Here, *genderfirst* is an indicator variable that is equal to one if the first child is male and zero if female. Note that even though $famCEO_i$ is a dichotomous variable, we estimate (2) using OLS, since a probit or a logit first stage can harm the consistency of the estimates [Angrist and Krueger, 2001]. The second-stage equation estimates the impact of family successions on changes in firm performance:

$$y_i = a_3 + X_3^{'}b_3 + c_3 \, fam\hat{C}EO_i + \varepsilon_{3i} \, , \tag{3}$$

where y_i is defined as in (1) and $fam\hat{C}EO_i$ are predicted values from (2). We are interested in c_3, which captures the direct effect of a family succession on performance.

III. B. Gender of the Firstborn Child: Firm and Family Characteristics

A valid instrumental variable requires meeting two criteria: it should affect the probability of observing a family succession, which we show in Table II Panel D, and it should not affect firm performance through other channels except for its direct effect on CEO succession decisions.[8] In Table III we explore the correlation of the gender of the first child of a departing CEO and an array of firm and family characteristics.

At the time of transition, we find no difference in terms of firm size, operating profitability, and net income between those firms whose departing CEO had a male or female first child. Table III stands in stark contrast to Table I, in which we found significant differences in firm characteristics for family and unrelated transitions.

One concern is that the gender of the first child might have a direct effect on family characteristics, which might, in turn, be affecting performance. For example, families with a strong preference for male children and whose firstborn child is female would tend to be larger in size than their male first-child counterparts. Family size could, in turn, affect firm performance, but its effect would be attributable to our instrument. To assess this potential channel, Table III presents the average number of children born to departing CEOs. It shows that, conditional on having at least one child, the average number of children is 2.2, irrespective of the gender of the first child. In short, we find no evidence that the gender of the first child affects family size.

Alternatively, and given the evidence from Dahl and Moretti [2004], who document differential marriage rates as a function of the gender of children (larger for males), male first children might affect the departing CEOs' marriage decisions, and marriage could potentially directly affect firms' prospects. If this effect were present in this sample, the IV strategy would be incorrectly attributing this effect to CEO talent. However, Table III shows that the fraction of

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[8] In case of heterogeneous treatment effects, monotonicity is also required to estimate a local average treatment effect. In our setting, monotonicity requires that, other things equal, there is no firm that chooses a family CEO when the first child is female but an unrelated successor when the first child is male. If treatment effects are, in contrast, homogenous, then the two conditions above suffice.

outgoing CEOs who are divorced is not statistically different for departing CEOs with female or male first children. Moreover, the last line of Table III shows that the total number of spouses that the outgoing CEO has had is no different for these two groups.

Furthermore, Table II Panel D previously highlighted that there is no significant difference in the share of non-child family CEOs for male first-child or female first-child firms, which suggests that male first-child firms do not differ in the degree of participation of non-child relatives.

In sum, based on Table III we find no evidence that firm or family characteristics differ as a function of our instrument. This "no difference" table bolsters our confidence that the gender of the first child of a departing CEO is uncorrelated to firms' outcomes, other than through its impact on CEO succession decisions.

IV. RESULTS

IV.A. Difference-in-Differences

To analyze the relative performance of family CEOs and despite its shortcomings highlighted in the previous sections, we present basic DD results as a benchmark.

Table IV Panel A presents results using industry-adjusted OROA for a three-year window before and after CEO transitions. Column I indicates that firms that experience CEO transitions exhibit lower-than-average profitability before succession. After transitions, however, they outperform their industry peers. The increase in performance is 0.8 percentage points, significant at the one-percent level. An average increase in performance around CEO transitions is consistent with previous studies in the CEO turnover literature [Denis and Denis, 1995; Huson et al., 2004].

When we compare profitability levels prior to family and unrelated successions (Columns II and III, respectively), we find that family (unrelated) transitions tend to occur in firms with above- (below-) average OROA. Prior to CEO transitions, the difference in profitability between these groupings is 1.6 percentage points, significant at the one-percent level.

Examining within-group variations in performance, we find that firms that promote family CEOs do not exhibit significant differences in performance around successions. In contrast, firms that promote external CEOs observe improvements in profitability of 1.3 percentage points, an increase that is significant at the one-percent level.

As a result, the average DD estimates suggest family successions are associated with a lower profitability of 1.41 percentage-points, relative to unrelated successions. This decline is equivalent to 21.7 percent of the average unadjusted OROA. The estimated gap in profitability is similar in magnitude to that found by Pérez-González [2006] using data from U.S. publicly traded firms.

In Table IV Panel B, we present the relative impact of family and unrelated CEOs using alternative measures of firm performance. To investigate whether the decline in performance around family transitions is due to firm or industry effects, as in Panel A, the first row shows unadjusted OROA as the performance measure and the second row presents industry-adjusted OROA. For both measures, the profitability of firms undergoing a family transition drops relative to other firms. One difference is that unadjusted measures suggest that the main effect is driven by a decline in performance of family CEOs, while the adjusted OROA shows it is driven by gains in profitability in unrelated-CEO firms. Median differences in unadjusted and industry-adjusted OROA indicate that the gap across groups is unlikely to be driven by outliers.

To test whether the results might be explained by mean-reversion relative to pre-transition performance, we also report changes in industry-and-performance–adjusted OROA [Barber and Lyon, 1996]. This measure is constructed using, as a control, firms in the same industry-adjusted performance decile grouping in the year prior to succession. The third row of Panel B shows that results are negative and significant at the one-percent level even after controlling for this effect. Also, using net income to assets obtains similar conclusions.

The last two rows of Table IV Panel B test for differences in the natural logarithm of assets and net sales to determine whether the gains in profitability for unrelated CEOs are a result of

declining assets or increased profits. The results indicate that unrelated successors increase the asset base more than family CEOs and that, unlike family heirs, they are able to increase revenue relative to pre-transition levels.

Overall, DD results indicate a robust result: family CEOs underperform relative to unrelated CEOs. The results hold regardless of the measure of performance used for both mean and median differences. Yet, it is difficult to establish causality. Results might be explained by omitted variables that account for both the decision to promote a family CEO and lower performance around transitions.

IV.B. Instrumental Variables Main Results

Given that the main objective of this paper is to isolate the causal effect of family CEOs on firm performance, we now turn to estimating the effect of family CEOs on firm performance using instrumental variables.

Table V Panel A presents the first-stage relationship between the gender of the departing CEO's firstborn child and the type of succession. Consistent with Table II, having a male first child is strongly positively correlated with a family transition. Firms whose departing CEO had a male first child are 9.6 percentage points more likely to appoint a family CEO, relative to those that had a female first child, a difference that is statistically significant at the one-percent level. In economic terms, it implies an increase in the probability of observing a family succession of 32.7 percent. Moreover, the *F*-statistic of 48.1 suggests that the gender of the first child is unlikely to be a weak instrument. As a result, the IV estimates are unlikely to be biased towards those of OLS [Bound, Jaeger, and Baker, 1995; Staiger and Stock, 1997; Stock and Watson, 2003].

One concern with the gender of the first-child indicator variable is that its variation might be capturing the effect of having a male child, a trait that families could partially affect by having more children, rather than the effect of the firstborn child, whose gender is presumably random. To investigate this possibility, we include in Column II a dummy variable indicating whether the

departing CEO has a male child. Not surprisingly, the coefficient of the gender of the first-child dummy falls significantly to four percentage points. Yet, the gender of the first-child indicator variable continues to be economically large and significant at conventional levels.

It is important to stress that, even though the male-child indicator variable is strongly positively correlated with family CEO appointments, it is difficult to convincingly claim that it meets the exclusion restriction. Families can affect the odds of having a male child by having more children. Similarly, while the number of male children and the ratio of male to total children are likely to be affected by CEO and firm characteristics, for reference, we also report first-stage results based on these variables in Columns III and IV.

In Column V we present an alternative specification using the gender of the first child as instrument and firm age and year dummies as added controls. In Column VI we further control for size and lagged industry-adjusted OROA, and in Column VII we use lagged industry-and-performance-adjusted OROA as a control. As suggested in Table I, the results show that family successions tend to occur in smaller and more profitable firms relative to those that promote unrelated CEOs. Results also indicate that older firms are more likely to undergo family transitions. In all cases, the point estimate on the gender of the first-child indicator variable hardly changes.

In sum, first-stage results indicate that the gender of the first child has a strong impact on firms' succession decisions. Moreover, the robustness of its estimated coefficient to the inclusion of firm characteristics suggests that the effect of the gender of the first child on family CEO appointments is potentially unaffected by firms' characteristics.

Having examined the strong impact of the gender of the first child on family CEO decisions, we turn to analyzing its effect on performance. We start by exploring the reduced-form correlation between the instrument and difference in firm OROA around CEO successions, our key dependent variable of interest.

The results are presented in Table V Panel B. We find a strong and negative correlation between changes in firm performance and having a male first child. The estimated coefficients

show that firms in which the departing CEO's firstborn child is male experience an average drop in OROA in the range of 0.8-1.2 percentage points relative to female first-child firms (Columns I, V, VI, and VII). In all cases, the reduced-form correlation is significant at the five-percent level. For reference, we show similar results using alternative "instruments" based on male children controls (Columns II-IV).

In reading the results from Table V Panel B, it is important to highlight that, while the gender of an individual's first child is likely to be randomly assigned, it is still possible that the timing of family versus unrelated CEO successions might differ in a way that could affect performance evaluations. However, the evidence presented in Table III suggests that firm characteristics conditional on the gender of the departing CEO's firstborn child are comparable: firm size, age, and profitability prior to CEO transitions are not statistically different from zero, which might ease some of these concerns. We will revisit these issues in Table VII.

Reduced-form results provide strong evidence that family successions hurt firm performance. They are arguably free from endogeneity and omitted variable concerns. Yet, the magnitude of this difference needs to be scaled to reflect the fact that it is driven by the subset of firms that appointed a family CEO due to the instrument.

In Table VI we examine the impact of family CEOs on performance around CEO successions using alternative specifications. To facilitate the comparison between OLS and IV estimates, in Columns I and II we provide OLS estimates of the effect of family successions on performance. As measures of firm performance, we use industry-adjusted (Columns I-VII) and industry-and-performance–adjusted (Column VIII) OROA.

The estimates in Table VI Column I are comparable to those shown in Table IV, conditional on having at least one child (Table IV shows OLS estimates based on the entire sample). As shown before, family CEOs are associated with lower performance around CEO transitions. The gap between family and unrelated CEOs is statistically significant at the one-percent level. In Column II we control for size, age, and profitability the year before the

succession. OLS estimates suggest that firms that promote family CEOs trail other firms around successions by approximately 0.8 to 1.4 percentage points in terms of profitability. Furthermore, consistent with mean-reversion, we find lower gains in performance for larger firms and for those whose pre-transition performance was superior. Firm age does not seem to affect changes in performance around successions.

Columns III through VIII of Table VI present the estimated coefficients using IVs. As anticipated by Table V, the impact of family CEOs on profitability is negative and statistically significant, regardless of the instrument we use. This result holds when we use the gender of the first child as the instrument, as well as when we replace it by the number of male children or the ratio of male to total children.[9]

In all cases, the magnitude of the estimated coefficient is larger than the one estimated using OLS, implying a reduction in profitability relative to unrelated transitions of at least six percentage points.[10] The large gap between IV and OLS estimates suggests that family successions tend to occur when unobserved firm performance is expected to improve or, alternatively, that unrelated CEOs tend to face more challenging environments. As a result, OLS underestimates the true differential in performance between family and unrelated CEOs.

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[9] The differences in the family-CEO estimated coefficients in Columns (III) to (VI) are hard to interpret as the number of male children or the gender ratio of children might not meet the exclusion restriction. For example, the number of family candidates is larger in firms in which the departing CEO has a large number sons and, as a result, family CEOs chosen in these firms are probably better than those chosen in firms in which the departing CEO has few sons. This alternative channel works against finding family CEO underperformance. Consistent with this notion, the estimated coefficient in Columns (IV) increases when we control for family size (results not shown). In addition, given the large standard errors, we cannot reject that the estimated coefficient varies significantly for these alternative instruments..

[10] An alternative explanation for the large gap between IV and OLS estimates is measurement error in the family succession variable. Given that family tree information is obtained from the official Danish Civil Registration System, measurement error concerns would tend to be minor. We also address this potential concern by examining the robustness of our estimates to different definitions of family transitions. Alternatively, we classify as family successions: (a) those events where the last names of the incoming and departing CEOs coincide or (b) those transitions where the incoming CEO was the offspring (as opposed to other relatives) of the departing CEO. Alternative family definitions do not affect the results (results not shown).

IV.C. Timing of CEO successions

Even though Table III provides evidence that the first child male–female groupings are comparable prior to succession in terms of size and profitability, a potential concern with the preceding results is that we might be capturing differences in performance attributed to a differential timing of CEO successions for family or unrelated managers.

In Table VII we present instrumental-variables-two-stage-least-squares (IV-2SLS) results for alternative windows of analysis before, during, and after CEO transitions. In Column I we examine changes in profitability using a window before the transition, estimated around year $t = -3$. In Column II we replicate the basic specification of Table VII containing a CEO transition, and in Column III we use a post-transition window centered at year $t = +3$. In all cases, changes in performance are computed as the difference in the three-year average industry-and-performance-adjusted OROA around the key date. Results are computed for all firms with data in each relevant window of analysis.

We fail to find a statistically significant difference between firms that undergo family successions and those that promote unrelated CEOs in any window of analysis, except for the window that contains CEO transitions (Column II). The result of Column I in Table VII indicates that performance prior to succession is not affected by the gender of the departing CEO's firstborn child. This result casts doubt on the idea that CEOs time their succession differentially as a function of the instrument. In addition, the result in Column III indicates that firms that undergo family transitions do not recover from the decline in performance suffered after succession. The lack of post-succession recovery is evidence of a permanent negative impact of family CEOs.

In Columns IV and V of Table VII, we examine the robustness of our findings on alternative subsamples based on the departing CEO's age. In Column IV we only include CEO transitions in which the departing CEO left the helm at a "normal" retirement age (between 55 and 70), as we want to test whether family underperformance is explained by late (early) retirement of founders. We find that normal retirement age transitions exhibit similar patterns of performance

between family and unrelated CEOs, compared to the entire sample. Specifically, the estimated gap in performance is 8.4 percentage points, significant at the five-percent level. In Column V of Table VII, we restrict the sample to successions in which the departing CEO leaves the position either before age 55 or after age 70. In this latter case, the estimated coefficient is comparable to that estimated in Column IV. However, the first stage is weaker, as younger CEOs are less likely to have adult children at the time of succession, and the standard errors in the second stage are twice as large.

An alternative test of the merits of family and unrelated CEOs that is less prone to criticism related to the timing of the transition is, following Johnson et al. [1985], to instrument for family CEOs using an indicator variable equal to one in cases where the departing CEO died in the year of the CEO change. The main advantage of this test is that the timing of the CEO succession is likely to be exogenous, as the timing of death tends to be unexpected. Yet, CEO deaths can potentially affect performance through other channels beyond the effect of a family or unrelated CEO. In Table VII Column VI, we present results using this alternative instrument. Consistent with our prior findings, we find that family CEOs harm firm performance. The estimated coefficient points to a decline in performance of 3.7 percentage points, significant at the one-percent level.

In the last column in Table VII, we present results when the sample is restricted to observations in which the outgoing CEO died around management transitions, and we use the gender of the first child as an instrument. A clear advantage of this specification is that it addresses both concerns related to the endogeneity of the timing of successions, as well as concerns related to the exclusion restriction. One disadvantage, however, is that the sample size falls dramatically. We find that even in this case, the estimated coefficient is negative and similar in magnitude to previous specifications, although its associated standard errors are almost four times those in Column II.

IV.D. The Impact of Firm and Industry Characteristics on the Value of Family CEOs

A different concern is that results might be explained by differences in reported, rather than actual, performance. Family CEOs might be more prone than unrelated CEOs to divert firms' cash flows to the controlling family, even when the core operating performance of the two groups is identical. In Table VIII we test for this possibility by examining whether the results are explained by small firms (Column I) or by firms that lack a formal board of directors (Column II). In Denmark, limited liability firms incorporated as ApS corporations (43 percent of the sample) can choose whether to have a board of directors. We show that these less-formal firms do not explain our results. Family-CEO underperformance exists for firms with above-median asset size, as well as for firms with a formal board of directors.

We also explore if the superior performance of unrelated CEOs is alternatively explained by changes in the governance structure of firms around CEO transitions. For example, unrelated CEOs might coincide with acquisitions by larger and more efficient firms. If that were the case, the finding of superior performance relative to family CEOs could not be interpreted as the product of outside managerial talent per se. To test for this possibility and in lieu of our lack of detailed ownership data, we restrict our analysis to firms in which at least one family member of the departing CEO stays on the board post-CEO transition. For this subsample, the economic magnitude and statistical significance of the estimated coefficient is almost identical to what we found for the full sample.

In Table VIII Columns IV to X, we assess the role of industry characteristics in explaining the differential performance of family and unrelated CEOs. In evaluating alternative industry characteristics, we hypothesize that managerial skills are potentially more valuable in certain economic environments, such as innovative industries, and less important in others, such as mature businesses with established production processes or organizational cultures.

A natural place to start this analysis is investigating the family-CEO gap in industries where family CEOs are relatively more common and, presumably, better suited for their positions.

To measure the relative frequency of family successions by industry, we divide the firms in the sample into two subsamples based on whether or not firms belonged to industries with an above-median concentration of family transitions. In Column IV we present results for the relative high family succession subsample. As expected, the negative impact of family transitions is mitigated. The point estimate is negative, although the coefficient is not statistically different from zero. Failing to find significant differences in performance in this latter case can potentially help to explain the gap between OLS and IV estimates. The latter are based on firms that promote a family CEO due to the gender of the first child. By *randomly* selecting family CEOs, the IV would under-represent those industries where family CEOs are normally present, relative to OLS.

We also test for the impact of family CEOs under a variety of industry environments using industry information on production growth, research and development (R&D) activities, wages per employee, average years of schooling by workers, import penetration, and growth volatility.[11] Column V in Table VIII shows that family CEOs significantly underperform in high-growth industries, while the coefficient on family succession in lower-growth and mature industries (results not shown) is lower and only significant at the 15-percent level. Column VI presents the estimated coefficient for family-CEO firms in industries with R&D spending, which is higher than the average for the entire sample but only marginally significant.

We further test for the skills required to manage firms by assessing the value of family CEOs in industries with relatively higher wages and educational attainment levels. There are several advantages of these alternative measures relative to R&D information. First, wage data are available for every industry in the economy. Second, a significant fraction of firms in the service

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[11] To investigate the impact of industry growth, industry wages, workers' schooling levels, import penetration, and output volatility, we divide the sample into two groups based on the median of the relevant variable. Industry growth and volatility is calculated using the value of production. Data on production growth, volatility, labor compensation, and import penetration are from Statistics Denmark (www.dst.dk). Data on industry schooling levels was constructed by the authors using confidential data on individual schooling and industry of employment from Statistics Denmark. We assess the impact of R&D activities by reporting the results for those firms in industries that report R&D expenses in the OECD Structural Analysis (STAN) database (www.oecd.org).

sector are high skilled with little or no R&D. Educational attainment levels, in contrast, provide a direct approximation for the formal skills acquired by workers in a given industry. Interestingly, both proxies for skill suggest that family CEOs are only statistically significantly harmful to performance in firms that operate in industries where human capital seems to be important. This result contrast with OLS differences, where no such pattern is evident.[12]

The level of import penetration does not seem to be important in explaining the gap between family and unrelated CEOs. High import penetration industries exhibit a similar estimated family-CEO effect as the average of the sample (Column IX). Conversely, output volatility does suggest that family CEOs might be particularly detrimental to performance in uncertain environments (Column X).

Overall, Table VIII documents that unrelated CEOs are particularly valuable in industries where professional managers would be expected to matter the most.

IV.E. Alternative Dependent Variables

In Table IX we investigate the impact of family CEOs on alternative measures of performance. We compute differences in net income, return on capital employed (ROCE), and firm assets around CEO transitions and report the results in Columns I, II, and III, respectively.[13] Firms that appoint family CEOs undergo economically and statistically significant declines in net income relative to assets. The estimated effect of family CEOs is -0.069, which, as it was the case with operating income, is significantly larger than the OLS estimate. Net income results suggest that the negative impact of family CEOs on operating profitability is not counterbalanced by a significant change in capital structure. Similarly, firms that promote family CEOs experience large declines in ROCE. The fact that ROCE falls significantly indicates that the lower operating return associated

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[12] Results not shown.
[13] Differences are estimated using the three-year post-succession performance measures minus the three-year average before transition. Net income is analyzed as a ratio of total assets. Return on capital employed is the ratio of operating income to the sum of the book value of equity plus the book value of debt. The measure of assets is the natural logarithm of assets in 2000 Danish Kroner.

with family CEOs is absorbed by firms' investors and is not the product of temporarily high levels of assets due to normal business transactions.

In Column III of Table IX, we assess if the lower performance of family CEO is explained by significantly larger investments relative to unrelated CEOs. Increases in the asset base could enhance future performance at the cost of short-term profitability. We do find support for that hypothesis: the estimated effect of family CEOs on total assets is negative, although statistically insignificant.

Finally, in Table IX Columns IV and V we assess whether the gap between family and unrelated CEOs can be explained by excessive risk-taking by unrelated CEOs. Family CEOs might focus on low-risk but valuable projects, while unrelated CEOs might instead seek high-risk high-reward investments. In Column IV we show that family CEOs are not associated with lower rates of bankruptcy or liquidation.

Given that financial distress is more likely to occur in those firms with relatively lower profitability, in Table IX Column V we examine the impact of family CEOs in the bottom 50 percent of the sample in terms of profitability. We find no evidence that family CEOs are less likely to fail. Interestingly and consistent with family-CEO underperformance, we find that firms with a family CEO are *more* likely to file for bankruptcy or to be liquidated than firms managed by unrelated CEOs. Moreover, higher rates of financial distress by family CEOs cast doubt on the idea that differences in operating performance across CEO types might be driven by strategic underreporting of firms' cash flows by family CEOs.

In sum, alternative measures of performance do not provide support to the idea that family CEOs invest at higher rates or fail less frequently than unrelated CEOs. They, in contrast, reinforce the hypothesis that non-family CEOs are valuable for firm performance.

IV.F. Local Effects and the Value of CEOs

A common caveat in interpreting the estimated results using instrumental variables is that not every firm in the sample responds to the instrument and, as such, the results of this paper are only representative for those firms whose succession decisions are affected by it. In particular, one might posit that the subsample of family CEOs who are promoted due to the instrument are of a lower average quality relative to the pool of family CEOs that gain control irrespective of it. If that were the case, the average causal effect of family CEOs on performance might not be as large as our IV results have documented. We proceed to address this potential concern by investigating the observable characteristics of incoming CEOs. We are particularly interested in assessing whether the gap in CEO skills between family and unrelated CEOs is significantly different for the average and the marginal family CEOs.[14]

Based on the KOB management files used to identity CEO successions, we are also able to determine if incoming CEOs previously held a CEO or a board position. Additionally, based on official educational attainment records at Statistics Denmark, we can estimate the number of years of schooling by incoming CEOs and whether they attended college or pursued graduate studies.[15]

Panel A in Table X presents average CEO characteristics for the entire sample (Column I) and as a function of the instrument: male (Column II) and female (Column III). We find that 24 percent of incoming CEOs were previously a CEO at other corporations. Interestingly, the ratio is 22.8 and 25.1 percent for male first-child and female first-child firms, respectively. The difference is two-percentage points, significant at the ten-percent level. In contrast, the share of incoming CEOs with an outside board position does not significantly vary as a function of the instrument.

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[14] In untabulated results we also investigate if the gap in performance for family and unrelated CEO is affected by incoming CEOs characteristics. We find that the difference in family CEO performance is larger in the seasoned relative to the inexperienced CEO subsamples. Yet, family-CEOs significantly underperform non family CEOs even in the subsample without previous CEO experience. We do not report those results as it is hard to claim that CEO characteristics are orthogonal to firms' investment prospects.

[15] We have information about the highest degree obtained by individuals. We use this information to identify whether incoming CEOs attended college or graduate studies. Also, we calculate years of schooling using the official length of educational programs, including technical degrees, which are widespread in Denmark.

Educational records provide striking evidence that CEO characteristics differ for male first-child and female first-child firms. While firms with a female first-child hire CEOs with only slightly higher number years of schooling (0.2 more years of schooling, or 1.5 percent), their incoming CEOs are 3.1 percentage points (eight percent) more likely to have attended college, relative to CEOs in male first-child firms; the difference is significant at the five-percent level.

In Panel B, we report summary CEO characteristics for family- and unrelated-CEO firms. It shows that there is a substantial difference in CEO experience and skills between family and unrelated CEOs: all measures of CEO experience indicate economically and statistically large differences in favor of unrelated CEOs (Column III). In line with the main results of this paper, Column IV in Panel B shows the IV-2SLS estimate of the gap in CEO attributes. As anticipated by the reduced form correlations in Panel A, family CEOs are significantly less likely to be seasoned CEOs and less likely to have attended college, relative to unrelated CEOs.

Columns III and IV of Panel B allow for a direct comparison between the characteristics of the average family CEO and those of the marginal family CEO, who are only promoted to the post as a result of the instrument. These columns report the average gap between family CEOs and unrelated CEOs for the entire sample (Column III) and for the marginal family CEOs (Column IV). In all cases, we cannot reject that the OLS and the IV-2SLS estimated differences in CEO characteristics are different from each other at conventional levels.

An alternative way to test if the average family CEO differs relative to the marginal CEO induced by the instrument is to compare the observable differences in CEO characteristics between male first-child family CEOs and other family CEOs. In Panel C we find no evidence that male primogeniture CEOs are different in terms of CEO experience or academic records.

In sum, Table X provides evidence that unrelated CEOs are significantly more qualified than family CEOs: they are more likely to have previously served as CEOs and to have attended college than family CEOs. Table X also shows that there are no statistically significant differences

in terms of observable CEO characteristics between the average family CEOs and those CEOs elected due to the instrument.

IV.G. Interpretation

In this paper we are explicit about the source of variation in family CEO appointments we use to examine the impact of family CEOs on firm performance. Given that the variation from the gender of the departing CEO's firstborn child is likely to be uncorrelated to firms' prospects, the results demonstrate that family successions cause significant declines in firm performance.

The findings show that qualified CEOs provide extremely valuable services to the organizations they head. They also demonstrate that primogeniture rules, which dictate who gains access to the helm of a firm based on birth order or gender, but not competence, can have large and negative consequences for firm performance.

The result that family members are selected to the top post despite their inferior performance is consistent with a non-pecuniary benefit of naming a CEO in accordance to the preferences of the departing CEO, which is reminiscent of Becker's [1957] and Goldberg's [1982] analyses of discrimination and nepotism, respectively. Moreover, the negative effect of family CEOs on performance suggests that minority shareholders at family-controlled firms are likely to suffer the most since they are unlikely to enjoy the private benefits of control of naming a family CEO. The results also indicate that other stakeholders interacting with family firms should pay close attention to succession decisions, as the competence gap between family and unrelated CEOs is substantial.

V. CONCLUSIONS

In this paper we used a unique dataset from Denmark to investigate the inside workings of family firms. Our objective was to shed light on two questions: First, do family characteristics

affect firm decisions? Second, what are the consequences of these decisions on firm performance? These questions were examined in the context of CEO succession decisions.

We showed that family characteristics have economically large effects on the decision to promote a family or an unrelated CEO. We addressed this question using a family trait that is likely to be exogenous: the gender of the firstborn child of the departing CEO. In particular, we found that male first-child firms are 32.7 percent more likely to appoint a family CEO than female first-child firms.

Using the variation in family CEO appointments associated with the gender of the first child, we then showed that family CEOs have a dramatically large and negative causal impact on firm performance. Our estimates are significantly larger than prior estimates in the literature and suggest that addressing endogeneity and omitted variable concerns is extremely important for understanding the impact of families on firm outcomes.

Our results provide direct evidence that unrelated CEOs are extremely valuable for the firms they lead. Moreover, the finding that family CEOs hurt firm performance might suggest that countries where the control and management of assets is commonly transferred among kin can potentially under-perform, compared to economies where assets and management are competitively matched.

The implications of our findings are also important for other settings in which families play an active role in firm decision making. La Porta et al. [1999] have documented that families are the most common large shareholders of publicly traded corporations and private firms are commonly associated with one family. Our results indicate that controlling families that enjoy the private benefits of control can endorse decisions that might be inferior for other stakeholders.

Finally, our findings could also be interpreted as evidence against having primogeniture rules in inheritances.

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TABLE I. FIRM CHARACTERISTICS BY TYPE OF CEO SUCCESSION

| Variable | All | Type of Succession | | Difference |
		Family	Unrelated	
	(I)	(II)	(III)	(IV)
Ln assets	8.605	8.232	8.791	-0.559 ***
	(0.0240)	(0.0332)	(0.0315)	(0.0458)
	[5,334]	[1,776]	[3,558]	
Operating return on assets (OROA)	0.065	0.074	0.061	0.013 ***
	(0.0020)	(0.0032)	(0.0025)	(0.0041)
	[5,334]	[1,776]	[3,558]	
Net income to assets	0.033	0.038	0.031	0.007 *
	(0.0019)	(0.0031)	(0.0024)	(0.0039)
	[5,334]	[1,776]	[3,558]	
Industry-adjusted OROA	-0.002	0.007	-0.006	0.014 ***
	(0.0020)	(0.0032)	(0.0025)	(0.0041)
	[5,334]	[1,776]	[3,558]	
Firm Age	19.417	19.826	19.213	0.613
	(0.3106)	(0.4840)	(0.3981)	(0.6267)
	[5,334]	[1,776]	[3,558]	

Notes:

a. The table presents firm characteristics at the time of the chief executive officer (CEO) transition.

b. CEO successions are classified into two groups: *family*, when the entering CEO is related by blood or marriage to the departing CEO, and *unrelated* otherwise.

c. *Ln* assets is the natural logarithm of the total book value of assets in Danish Kroner. OROA is the operating income (*Primært resultat*) to book value of assets. Net income to assets is the ratio of net income (*Årets resultat*) to book value of assets. Industry-adjusted OROA is the difference between OROA and the average of its four-digit NACE (European industry classification system) benchmark. Firm age is the difference between the year of CEO transition and the oldest of: the year of establishment, the year of registration, or the year of firms' bylaws.

d. Firm characteristics are from the *Købmandsstandens Oplysningsbureau*'s (KOB) dataset, which is based on firms' annual reports to the Danish Ministry of Economic and Business Affairs.

e. Standard errors are in parentheses and the numbers of observations are in square brackets. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE II. FIRM SUCCESSIONS AND FAMILY CHARACTERISTICS OF DEPARTING CEOS

Description	Number of Successions	Type of Succession							
		Family		Unrelated		Family: Children		Family: Others	
		Number	Share	Number	Share	Number	Share	Number	Share
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)
All	5,334	1,776	0.333	3,558	0.667	863	0.162	913	0.171
A. Number of spouses:									
0	434	79	0.182	355	0.818	5	0.012	74	0.171
1	4,282	1,541	0.360	2,741	0.640	802	0.187	739	0.173
2 or more	618	156	0.252	462	0.748	56	0.091	100	0.162
Difference (2 or more) minus (1)			**-0.107** ***				**-0.097** ***		**-0.011**
			(0.020)				(0.013)		(0.016)
B. Number of children:									
0	642	159	0.248	483	0.752	-	0.000	159	0.248
1	807	235	0.291	572	0.709	96	0.119	139	0.172
2	2,397	770	0.321	1,627	0.679	389	0.162	381	0.159
3	1,152	476	0.413	676	0.587	296	0.257	180	0.156
4 or more	336	136	0.405	200	0.595	82	0.244	54	0.161
Difference (1) minus (0)			**0.044** *				**0.119** ***		-0.075 ***
			(0.023)				(0.011)		(0.022)
Difference (3) minus (1)			**0.122** ***				**0.138** ***		-0.016
			(0.022)				(0.017)		(0.017)
C. By gender ratio (male/children):									
< 50 percent	1,511	437	0.289	1,074	0.711	161	0.107	276	0.183
= 50 percent	1,345	451	0.335	894	0.665	248	0.184	203	0.151
> 50 percent	1,836	729	0.397	1,107	0.603	454	0.247	275	0.150
Difference (>50%) minus (< 50%)			**0.108** ***				**0.141** ***		-0.033 **
			(0.016)				(0.013)		(0.013)
D. By gender of first born child:									
Female	2,216	652	0.294	1,564	0.706	281	0.127	371	0.167
Male	2,476	965	0.390	1,511	0.610	582	0.235	383	0.155
Difference male minus female			**0.096** ***				**0.108** ***		-0.013
			(0.014)				(0.011)		(0.011)

Notes:

a. The table presents family characteristics at the time of the chief executive officer (CEO) transition.

b. CEO successions are classified into two groups: *family*, when the entering CEO is related by blood or marriage to the departing CEO, and *unrelated* otherwise. Family successions are further classified as *family—children* successions, when the entering CEO is the child of the departing executive, and *family—others* otherwise.

c. In Panels (A) to (D), the share of family and unrelated successions are presented by alternative family characteristics of the departing CEOs: (A) the number of spouses, (B) the number of children, (C) the ratio of sons to the total number of children, and (D) the gender of the firstborn child.

d. CEO successions data are from *Købmandsstandens Oplysningsbureau*'s (KOB) dataset. Family characteristics data are from the Danish Civil Registration System.

e. Standard errors are presented in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE III. FIRM AND FAMILY CHARACTERISTICS BY THE GENDER OF THE FIRST CHILD OF DEPARTING CEOS

| Variable | All | Gender of First Child | | Difference |
		Male	Female	
	(I)	(II)	(III)	(IV)
Ln assets	8.638	8.617	8.662	-0.045
	(0.0255)	(0.0352)	(0.0369)	(0.0510)
	[4,692]	[2,476]	[2,216]	
Operating return on assets (OROA)	0.067	0.066	0.069	-0.003
	(0.0022)	(0.0030)	(0.0031)	(0.0043)
	[4,692]	[2,476]	[2,216]	
Net income to assets	0.035	0.033	0.037	-0.004
	(0.0020)	(0.0028)	(0.0029)	(0.0040)
	[4,692]	[2,476]	[2,216]	
Industry-adjusted OROA	-0.0003	-0.0028	0.0024	-0.0052
	(0.0021)	(0.0030)	(0.0031)	(0.0043)
	[4,692]	[2,476]	[2,216]	
Firm Age	19.247	19.307	19.180	0.127
	(0.3175)	(0.4370)	(0.4621)	(0.6361)
	[4,692]	[2,476]	[2,216]	
Number of children of departing CEO	2.236	2.240	2.231	0.009
	(0.0127)	(0.0175)	(0.0184)	(0.0253)
	[4,692]	[2,476]	[2,216]	
Departing CEO marital status is divorced	0.067	0.067	0.067	0.000
	(0.0037)	(0.0050)	(0.0053)	(0.0073)
	[4,692]	[2,476]	[2,216]	
Number of spouses of departing CEO	1.100	1.109	1.091	0.018
	(0.0063)	(0.0089)	(0.0087)	(0.0125)
	[4,692]	[2,476]	[2,216]	

Notes:

a. The table presents firm and family characteristics at the time of the chief executive officer (CEO) transition.

b. CEO successions are classified by the gender of the first child born to the departing CEO: *male* when the firstborn child is male and *female* when she is female. Firms where the departing CEO had no children are omitted.

c. *Ln* assets is the natural logarithm of the total book value of assets in Danish Kroner. OROA is the operating income (*Primært resultat*) to book value of assets. Net income to assets is the ratio of net income (*Årets resultat*) to book value of assets. Industry-adjusted OROA is the difference between OROA and the average of its four-digit NACE (European industry classification system) benchmark. Firm age is the difference between the year of CEO transition and the oldest of: the year of establishment, the year of registration, or the year of firms' bylaws. Number of children of departing CEO is the number of children registered in the Danish Civil Registration System. Departing CEO marital status is divorced is an indicator variable equal to one when the marital status of the departing CEO at the time of the transition is divorced, zero otherwise. Number of spouses of departing CEO is the number of different spouses registered in the Danish Civil Registration System that the departing CEO had had at the time of the CEO transition.

d. Standard errors are in parentheses and the numbers of observations are in square brackets. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE IV. CEO SUCCESSION DECISIONS AND FIRM PERFORMANCE AROUND CEO TRANSITIONS

Panel A. Dependent Variable: Industry-Adjusted Operating Return on Assets (OROA)

| | All | Type of Succession | | Difference |
| | | Family | Unrelated | |
	(I)	(II)	(III)	(IV)
Before	-0.0032	0.0077	-0.0085	0.0162 ***
	(0.0016)	(0.0024)	(0.0020)	(0.0031)
	[5,334]	[1,776]	[3,558]	
After	0.0053	0.0067	0.0046	0.0021
	(0.0016)	(0.0026)	(0.0020)	(0.0033)
	[5,334]	[1,776]	[3,558]	
Difference	0.0084 ***	-0.0010	0.0132 ***	-0.0141 ***
	(0.0018)	(0.0028)	(0.0023)	(0.0036)

Panel B. Alternative Dependent Variables (Difference-in-Differences (DD) analysis)

| | Type of Transition | | | |
| *Differences in* | Family | Unrelated | Mean Difference-in-Differences | Median DD |
	(I)	(II)	(III)	(IV)
Operating return on assets (OROA)	-0.0120 ***	0.0035	-0.0154 ***	-0.0082 ***
	(0.0028)	(0.0023)	(0.0036)	(0.0027)
Industry-adjusted OROA	-0.0010	0.0132 ***	-0.0141 ***	-0.0071 ***
	(0.0028)	(0.0023)	(0.0036)	(0.0027)
Industry-and-performance-adjusted OROA	0.0009	0.0107 ***	-0.0098 ***	-0.0066 ***
	(0.0027)	(0.0021)	(0.0034)	(0.0025)
Industry-adjusted net income to assets	-0.0056 *	0.0064 ***	-0.0120 ***	-0.0060 ***
	(0.0029)	(0.0022)	(0.0036)	(0.0023)
Ln assets	0.0092 ***	0.0300 ***	-0.0208 ***	-0.0050 ***
	(0.0022)	(0.0019)	(0.0029)	(0.0019)
Ln sales	0.0003	0.0216 ***	-0.0213 ***	-0.0057 **
	(0.0059)	(0.0038)	(0.0070)	(0.0025)

Notes:

a. Chief executive officer (CEO) successions are classified into two groups: *family*, when the entering CEO is related by blood or marriage to the departing CEO, and *unrelated* otherwise.

b. Panel A reports average industry-adjusted OROA before (three-year average) and after (three-year average) successions, and differences in these measures around CEO transitions. Panel B presents differences (differences-in-differences (DD)) around CEO transitions (and across succession groups) for the three-year averages of the following variables (I) OROA, (II) industry-adjusted OROA, (III) industry-and-performance–adjusted OROA, (IV) industry-adjusted net income to assets, (IV) *ln* assets, and (VI) *ln* sales. In all cases, the year of succession is omitted.

c. OROA, industry-adjusted OROA, industry-adjusted net income to assets and *Ln* assets are defined in Table III. *Ln sales* is the natural logarithm of sales in Danish Kroner. *Industry-and-performance-adjusted OROA* is the difference between OROA and the average of the firms in the same decile grouping of industry-adjusted OROA the year prior to succession.

d. Standard errors are in parentheses and the numbers of observations are in square brackets. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE V. GENDER OF THE FIRSTBORN CHILD, FAMILY SUCCESSIONS AND PERFORMANCE

Panel A. First Stage	Dependent Variable: Family CEO						
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Gender of the first born child is male	0.0955 *** (0.0138)	0.0404 ** (0.0171)			0.0955 *** (0.0136)	0.0927 *** (0.0135)	0.0936 *** (0.0135)
Male child indicator variable		0.1162 *** (0.0191)					
Number of male children			0.0737 *** (0.0077)				
Ratio male to total children				0.1436 *** (0.0186)			
Ln assets					-0.0448 *** (0.0034)	-0.0515 *** (0.0036)	-0.0508 *** (0.0037)
Firm age						0.0016 *** (0.0003)	0.0015 *** (0.0003)
Industry-adjusted OROA t=-1						0.2446 *** (0.0445)	
Industry-and-performance-adjusted OROA, t=-1							0.3374 *** (0.0792)
Year controls	No	No	No	No	Yes	Yes	Yes
F-statistic	48.058	46.566	91.768	59.494	25.590	26.506	24.662
Number of CEO transitions	4,692	4,692	4,692	4,692	4,692	4,692	4,692

Panel B. Reduced Form	Dependent Variable: Differences in Operating Profitability around CEO Successions (three-year average post succession) - (three-year average pre-transition)						
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Gender of the first born child is male	-0.0120 *** (0.0038)	-0.0123 *** (0.0045)			-0.0121 *** (0.0038)	-0.0086 ** (0.0035)	-0.0083 ** (0.0034)
Male child indicator variable		0.0006 (0.0054)					
Number of male children			-0.0045 ** (0.0022)				
Ratio male to total children				-0.0116 ** (0.0053)			
Ln assets					-0.0040 *** (0.0010)	-0.0027 *** (0.0010)	-0.0029 *** (0.0010)
Firm age						-0.0000 (0.0001)	0.0000 (0.0001)
Industry-adjusted OROA, t=-1						-0.3737 *** (0.0163)	
Industry-and-performance-adjusted OROA, t=-1							-0.4219 *** (0.0311)
Year controls	No	No	No	No	Yes	Yes	Yes
Number of CEO transitions	4,692	4,692	4,692	4,692	4,692	4,692	4,692

Notes:

a. In Panel A, the dependent variable is an indicator variable equal to one if the incoming chief executive officer (CEO) is related by blood or marriage to the departing CEO, zero otherwise. In Panel B, the dependent variable is the change in firm profitability around CEO transitions.

b. In Panel B Columns (I)–(VI), firm profitability is defined as the industry-adjusted OROA. In Panel B Column (VII), firm profitability is defined as industry-and-performance-adjusted OROA. Changes in profitability are computed as the difference between the average, three-year post-succession profitability minus the three-year average before transition. The year of succession is omitted.

c. Gender of the firstborn child is male is an indicator variable equal to one if the firstborn child of the departing CEO is male, zero if she is female. Male child indicator variable is an indicator variable equal to one if the departing CEO has at least one male child, zero otherwise. Number of male children is the number of departing CEO's male children registered at the time of transition. Ratio of male to total children is the ratio of the number of departing CEO's sons to total number of children. *Ln* assets, firm age, and industry-adjusted OROA are defined in Table III. Industry-and-performance-adjusted OROA is defined in Table IV.

d. Robust standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE VI. FIRM PERFORMANCE AND FAMILY SUCCESSIONS: OLS AND INSTRUMENTAL VARIABLES

	Dependent Variable: Differences in Operating Profitability around CEO Successions (three-year average post succession) - (three-year average pre-transition)							
	OLS		IV-2SLS					
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Family CEO	-0.0142 ***	-0.0079 **	-0.1260 ***	-0.0722 **	-0.0606 **	-0.0808 **	-0.0928 **	-0.0886 **
	(0.0038)	(0.0036)	(0.0429)	(0.0317)	(0.0298)	(0.0383)	(0.0393)	(0.0384)
Ln assets		-0.0030 ***					-0.0074 ***	-0.0074 ***
		(0.0010)					(0.0023)	(0.0022)
Firm age		0.0000					0.0001	0.0002
		(0.0001)					(0.0001)	(0.0001)
Industry-adjusted OROA, t=-1		-0.3727 ***					-0.3510 ***	
		(0.0164)					(0.0198)	
Industry-and-performance-adjusted OROA, t=-1								-0.3920 ***
								(0.0350)
Year controls	No	Yes	No	No	No	No	Yes	Yes
Number of CEO transitions	4,692	4,692	4,692	4,692	4,692	4,692	4,692	4,692
Instrumental variables								
Gender of the first child			√	√			√	√
Male child indicator variable				√				
Number of male children					√			
Ratio male to total children						√		

Notes:

a. Estimated coefficients in Columns (I) and (II) are from least squares regressions. Estimated coefficients in Columns (III)–(VIII) are from IV-2SLS regressions.

b. In Columns (I)–(VII) the dependent variable is the change in industry-adjusted OROA around CEO successions as defined in Table V. In Column (VIII) the dependent variable is the change in industry-and-performance-adjusted OROA around CEO successions as defined in table V.

c. Family CEO, the instrumented variable, is defined in Table V. Depending on the specification, as indicated above, the instrumental variables are: gender of the firstborn child of a departing CEO (1 = male, 0 = female), male child indicator variable (1 = departing CEO has at least one son at the time of succession, 0 = otherwise), number of male children of the departing CEO, and ratio of male to total number of children of the departing CEO. Other control variables are defined in Tables III and IV.

d. Robust standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE VII. ALTERNATIVE WINDOWS OF ANALYSIS AND SUBSAMPLES BASED ON INDIVIDUAL CHARACTERISTICS

	Dependent variable: Differences in Industry-and-Performance-Adjusted Operating Profitability (three-year average post succession) - (three-year average pre-transition)						
	Windows			Sub-samples			
	Pre-transition differences in performance	Differences in performance around CEO transitions	Post-transition differences in performance	Departing CEO's age (55,70)	Departing CEO's age other than (55,70)	Full sample	CEO transition and departing CEO death occur in the same year
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Family CEO	0.0325	-0.0886 **	-0.0435	-0.0836 **	-0.0962	-0.0372 ***	-0.1475
	(0.0420)	(0.0384)	(0.0608)	(0.0382)	(0.0926)	(0.0141)	(0.1411)
Year controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of CEO transitions	2,480	4,692	1,511	2,159	2,533	5,334	447
Instrumental variables							
Gender of the first child	√	√	√	√	√		√
Death of CEO around transition						√	

Notes:

a. All results are from IV-2SLS regressions.
b. Profitability is defined as industry-and-performance-adjusted OROA. *Pre-transition* change in profitability in Column (I) is computed as the difference between the average three-year profitability after year $t = -3$ minus the three-year average before, where the year $t = -3$ is omitted. *Transition* changes in profitability in Columns (II) and (IV)–(VII) are computed as the difference between the average, three-year post-succession profitability minus the three-year average before transition, where the year of succession is omitted. *Post-transition* change in profitability in Column (III) is computed as the difference between the average three-year profitability after year $t = +3$ minus the three-year average before, where the year $t = +3$ is omitted.
c. Family CEO (chief executive officer), the instrumented variable, is defined in Table V. The instrumental variable in Columns (I)–(V) and in Column (VII) is the gender of the firstborn child of the departing CEO (1 = male, 0 = female). The instrumental variable in Column (VI) is death of the departing CEO around transition (1 = outgoing CEO dies in the year of the succession, 0 = otherwise).
d. The number of successions in Columns (I)–(III) reflects the number of firms with available data for the relevant analysis. Column (IV) reports results for firms where the departing CEO was between 55 and 70 years of age at the time of transition. Column (V) reports results for firms where the departing CEO's age was either below 55 or above 70 at the time of transition. Column (VI) shows results for the full sample. Finally, Column (VII) uses observations where the departing CEO died at the time of transition.
e. All specifications include controls for (estimated coefficients are not reported): *Ln* assets, firm age*,* and industry-and-performance-adjusted OROA the year prior to succession. These variables are defined in Tables III and IV.
f. Robust standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE VIII. OTHER SUBSAMPLES BASED ON FIRM AND INDUSTRY CHARACTERISTICS

Dependent variable:
Differences in Industry-and-Performance-Adjusted Operating Profitability
(three-year average post succession) - (three-year average pre-transition)

	Firm characteristics			Industry characteristics						
	Firms with assets ≥ median	Firms with formal board of directors	Firms with family members in board post- succession	*High* share of family CEO	*High* growth	Reports *R&D* spending	*High* per worker wages	*High* labor force schooling levels	*High* import penetration	*High* output volatility
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)
Family CEO	-0.1140 **	-0.0934 **	-0.0901 *	-0.0507	-0.1211 **	-0.1191	-0.1414 **	-0.1568 **	-0.0970 *	-0.1330 **
	(0.0478)	(0.0470)	(0.0518)	(0.0406)	(0.0606)	(0.0760)	(0.0668)	(0.0656)	(0.0527)	(0.0636)
Year controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of CEO transitions	2,397	3,239	1,533	2,022	2,312	2,012	2,045	1,882	2,174	2,015

Notes:

a. All results are from IV-2SLS regressions.

b. The dependent variable is the difference in industry-and-performance-adjusted OROA around chief executive officer (CEO) successions as defined in Table V. Family CEO, the instrumented variable, is defined in Table V. The instrumental variable is the gender of the firstborn child of the departing CEO (1 = male, 0 = female).

c. Columns (I)–(III) present results for subsamples of firms based on firm characteristics. Column (I) presents results for firms with book value of assets above the median of the sample at the time of succession. Column (II) presents results for firms with a formal board of directors at the time of transition. Column (III) presents results for firms in which there was at least one family member of the departing CEO in the board after succession. Columns (IV)–(X) present results for subsamples of firms based on industry characteristics. Column (IV) present results for firms in industries that are above the median in terms of prevalence of family CEO transitions. Column (V) present results for firms in industries with above-median production growth during the sample period. Column (VI) presents data for firms in industries with positive research and development (R&D) spending. Columns (VII)–(X) present data for firms in industries with higher than the sample median levels of (i) per worker wages, (ii) educational attainment, (iii) import penetration, and (iv) output volatility. Variables in Columns (V)–(IX) are constructed using industry-level data for 1990 to 2002. Output volatility was estimated using the volatility of output growth between 1966 and 2002.

d. Data on production growth, labor compensation, import penetration, and output volatility at the industry-level are from Statistics Denmark's public website. Average schooling levels by industry were constructed by the authors using confidential data from Statistics Denmark. Data on industry-level R&D spending are from the OECD STAN database.

e. All specifications include controls for (estimated coefficients are not reported): *Ln* assets, firm age*,* and industry-and-performance-adjusted OROA the year prior to succession. These variables are defined in Tables III and IV.

f. Robust standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE IX. ALTERNATIVE DEPENDENT VARIABLES

	Net Income to Assets	Return on Capital Employed	Log of Assets	Bankruptcy / Liquidation	Bankruptcy / Liquidation
	(I)	(II)	(III)	(IV)	(V)
Family CEO	-0.0688 **	-0.1172 **	-0.3059	0.0588	0.1715 *
	(0.0345)	(0.0455)	(0.2387)	(0.0553)	(0.1020)
Year controls	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes
Number of CEO transitions	4,692	2,553	4,692	4,568	2,258

Notes:

a. All results are from IV-2SLS regressions.
b. The dependent variables in Columns (I)–(III) are the difference between the three-year, post-succession performance measures minus the three-year average before transition. Net income to assets is the industry-adjusted ratio of net income to total assets. Return on capital employed is the ratio of operating income to the sum of the book value of equity plus the book value of debt. Log of assets is the natural logarithm of total assets in 2000 Danish Kroner. The dependent variable in Columns (IV) and (V) is bankruptcy/liquidation, an indicator variable equal to one if the firm is under a bankruptcy or liquidation procedure in the three years post-transition, zero otherwise. Bankruptcy/liquidation is reported for (a) all firms with matching bankruptcy/liquidation status (Column (IV)) and for (b) firms with matching bankruptcy/liquidation status in the bottom 50 percent of the sample in terms of profitability (Column (V)).
c. Family CEO (chief executive officer), the instrumented variable, is defined in Table V. The instrumental variable is the gender of the firstborn child of the departing CEO (1 = male, 0 = female).
d. Data on bankruptcy and liquidation procedures are from Danish Commerce and Companies Agency (*Erhvervs- og Selskabsstyrelsen*), at the Ministry of Economic and Business Affairs.
e. All specifications include controls for (estimated coefficients are not reported): *Ln* assets, firm age, and mean industry-adjusted net income to assets prior to succession. These variables are defined in Table III. Columns (IV) and (V) also include industry-indicator variables at the one-digit NACE level.
f. Standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE X. CEO CHARACTERISTICS BY TYPE OF TRANSITION

	Type of CEO Transition				
	(I)	(II)	(III)	(IV)	(V)
A. By gender of the first child:	**All**	**First-child male**	**First-child female**	**Difference**	**IV-2SLS**
CEO previously held a CEO position	0.2417	0.2278	0.2509	-0.023 *	
	(0.0059)	(0.0084)	(0.0092)	(0.0125)	
CEO previously held a board position	0.2887	0.2892	0.2938	-0.005	
	(0.0062)	(0.0091)	(0.0097)	(0.0133)	
Number of years of schooling by CEO	13.333	13.2482	13.4476	-0.199 **	
	(0.0388)	(0.0561)	(0.0601)	(0.0822)	
CEO attended college or a graduate program	0.3928	0.3809	0.4115	-0.031 **	
	(0.0068)	(0.0099)	(0.0106)	(0.0145)	
B. By family links:		**Family**	**Unrelated**	**Difference**	**IV-2SLS**
CEO previously held a CEO position		0.1543	0.2853	-0.131 ***	-0.242 *
		(0.0086)	(0.0076)	(0.0114)	(0.130)
CEO previously held a board position		0.2410	0.3125	-0.072 ***	-0.048
		(0.0102)	(0.0078)	(0.0128)	(0.139)
Number of years of schooling by CEO		12.659	13.677	-1.018 ***	-1.992 **
		(0.0595)	(0.0491)	(0.0771)	(0.818)
CEO attended college or a graduate program		0.2787	0.4511	-0.172 ***	-0.306 **
		(0.0107)	(0.0085)	(0.0137)	(0.144)
C. Family transitions only:		**Firstborn male CEO**	**Other family CEO**	**Difference**	
CEO previously held a CEO position		0.1407	0.1583	0.018	
		(0.0173)	(0.0099)	(0.0199)	
CEO previously held a board position		0.2247	0.2458	0.021	
		(0.0208)	(0.0116)	(0.0238)	
Number of years of schooling by CEO		12.774	12.625	-0.149	
		(0.1092)	(0.0700)	(0.1297)	
CEO attended college or a graduate program		0.2730	0.2804	0.007	
		(0.0222)	(0.0123)	(0.0254)	

Notes:

a. Chief executive officer (CEO) successions are classified by: (A) the gender of the first firstborn child of the departing CEO: *male* or *female*; (B) family ties: *family*, when the entering CEO is related by blood or marriage to the departing CEO, and *unrelated* otherwise; (C) firstborn male status: one when the incoming family CEO is a firstborn male, zero otherwise.

b. Incoming CEO characteristics include: (i) CEO previously held a CEO position, is indicator variable equal to one when the incoming CEO worked as CEO in another corporation in the three years prior to appointment, (ii) CEO previously held a board position, is indicator variable equal to one when the incoming CEO was identified as member of the board of director in another corporation in the three years prior to appointment, (iii) number of years of schooling by CEO, is calculated using educational attainment records from elementary, middle high-school, high-school, vocational, college, and postgraduate programs, (iv) CEO attended college or a graduate program, is an indicator variable equal to one when the incoming CEO attended college or a postgraduate program.

c. CEO previously held a CEO position and CEO previously held a board position are constructed using data from *Købmandsstandens Oplysningsbureau* (KOB). Number of years of schooling by CEO and CEO attended college or a graduate program are constructed using confidential data on individual schooling from Statistics Denmark.

d. Column (IV) reports differences of means between Column (III) and Column (II).

e. Column (V) in Panel B reports the IV-2SLS estimated differences for family successions, relative to unrelated successions. Family CEO, the instrumented variable, is defined in Table V. The instrumental variable is the gender of the firstborn child of the departing CEO (1 = male, 0 = female).

f. Standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.