Family to Firm Expansion: How Does the CEO Children Number Affect Corporate Investment?

Short title: Parent CEOs and Corporate Investment

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Abstract

We develop a simple model to analyze the effects of the number of a CEO's children on corporate investment. Data from a sample of CEOs of S&P 500 firms from 1998-2018 support the model's predictions that a CEO with more children has on average higher propensity to allocate firm resources to activities increasing its size, while also reducing its cash flow risk. This relationship is attenuated for firms with better corporate governance but also for financially constrained firms. Excessive corporate investment by CEOs with more children is generally followed by a negative stock market reaction. Overall, entrenchment-increasing overinvestment and cash flow risk reduction can be seen as a CEO's optimal responses to their greater non-financial and financial responsibility, expected unemployment cost and the cost of effort (degree of inattention) resulting from a higher children number.

Keywords: Resource Allocation, Investments, Chief Executive Officers (CEO), Upper Echelons, Agency Conflicts

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1 Introduction

The notion of the unique role of chief executive officers (CEOs) in affecting corporate outcomes has been widely supported in the management and finance literature (e.g., Bertrand and Schoar, 2003; Bigley and Wiersema, 2002; Chin, Hambrick, and Treviño, 2013; Petrenko, Aime, Ridge, and Hill, 2016). According to agency theory (Eisenhardt, 1989; Jensen, 1986), CEOs tend to pursue self-serving agendas that conflict with shareholders' interests unless appropriate monitoring and incentive schemes are in place (Daily, Dalton, and Cannella, 2003; Gomez-Mejia, Tosi, and Hinkin, 1987). Upper echelons theory (Chatterjee and Hambrick, 2007; Hambrick and Mason, 1984) implies that CEOs have significant discretion in changing organizational strategies in a way that suits their past experiences, values, and personalities. Key CEO characteristics that have been shown to influence firm policies include a CEO's personality traits (e.g., Green, Jame, and Lock, 2019; Harrison, Thurgood, Boivie, and Pfarrer, 2020; Malhotra, Reus, Zhu, and Roelofsen, 2018; Malmendier and Tate, 2005; Nadkarni and Herrmann, 2010), previous experiences (e.g. Benmelech and Frydman, 2015; Dittmar and Duchin, 2016; Islam and Zein, 2020), and family characteristics (Dahl, Dezső, and Ross, 2012; Roussanov and Savor, 2014). Regarding corporate investment, the extant literature demonstrates that decisions are affected by a CEO's individual-specific traits such as overconfidence (Malmendier and Tate, 2005), age and education (Barker and Mueller, 2002), and marital status (Roussanov and Savor, 2014).

In this paper, we adopt an agency perspective and relate the increased size of CEOs' family and their associated career concerns to the decision to influence the company size and risk. The proposed research is of considerable practical significance for corporate boards, shareholders and business partners, since it brings to attention the potential influence of executives' normative family transitions on shaping key resource allocation decisions. Specifically, we explore the number of a

CEO's children, a critical aspect of their demographic characteristics, as a factor affecting corporate investment choices. Having children can influence a CEO's personal preferences manifested in their selected course of corporate actions. We postulate that the higher number of children is likely to affect a CEO's corporate actions in two ways. First, it is expected to increase their financial and non-financial responsibility towards the family and make potential dismissal more costly to them, also in non-monetary terms. Second, it is likely to increase a CEO's cost of effort and the degree of inattention to corporate matters. We find that faced with a combination of greater responsibility and, effectively, lower resource base (limited attention), an average CEO responds by increasing entrenchment through overinvesting and reducing the firm risk.

CEOs are risk-averse agents and prefer to choose conservative policies unless incentivized to do otherwise (Fama and Laffer, 1972; Jensen and Meckling, 1976). The incentives can arise from both external, such as stock grants or market competition, or internal sources, such as changes in personal life experiences. When the family grows, increased consumption commitment of a growing family amplifies the CEO's desire to increase their job security.[1] There is ample evidence that a large fraction of previously dismissed ex-CEOs are in jobs below the CEO level.[2] The personal cost of dismissal increases with family size due to the level of consumption (lifestyle) a CEO is accustomed to. In non-monetary terms, a CEO' reputation may be substantially eroded following a turnover decision (Milbourn, 2003). Previous empirical work shows that parents' income, education, and most importantly, occupational status affect children's health, cognitive development,

[1]Even though CEOs with a larger family size may be more incentivized to increase their income levels as well, mixed arguments are presented. Roussanov and Savor (2014) argue that wealthy individuals such as corporate CEOs consider increasing income levels to maintain household consumption as of a second-order importance. However, Dahl et al. (2012) find that CEOs tend to divert more resources for their families and pay themselves more when becoming a parent.

[2]Based on a sample of over 18,000 executives, Botelho, Wright, and Powell (2018) find that managers are more likely to receive a strong "do not hire" recommendation following dismissal. Similarly, Sonnenfeld and Ward (2007) show that 22% of dismissed CEOs stepped back and take advisory roles while 43% effectively ended their careers. Coyne and Coyne Sr (2007) label 65% of departing CEOs as "dropouts", who moved quite far down the corporate ladder.

academic competence, and socio-emotional well-being (e.g., Bradley and Corwyn, 2002; Chen, Liu, and Li, 2000; Erola, Jalonen, and Lehti, 2016). Specifically, Chen et al. (2000) point out that child achievement is closely dependent on the reputation of the family, particularly the father. Therefore, we expect that the adverse impact on child development of a CEO's reputation loss resulting from dismissal exacerbates the (personal) cost of potential unemployment. Furthermore, an increase in the family size may reduce the time a CEO can allocate to finding a new role, which adds to the expected costs of unemployment.[3]

Jensen (1986) argues that managers have incentives to increase resources under their control, through overinvestment, with the aim of extracting private benefits such as status, power, and higher compensation (Bebchuk and Fried, 2005; Dow and Raposo, 2005; Jensen and Murphy, 1990; Nikolov and Whited, 2014; Stulz, 1990; Williamson, 1963; Yim, 2013). According to Shleifer and Vishny's (1988) entrenchment theory, managers pursue excess growth by investing in assets closely related to their individual-specific human capital, in order to make themselves more indispensable for their firm.[4] Also, Amihud and Lev (1981) show that managers engage in conglomerate mergers to diversify their employment risk. Based on this view, we expect that the increased financial responsibility and expected unemployment costs of a parent CEO would lead to overinvestment as a way of increasing their entrenchment.

At the same time, when a CEO has more children, they are more likely to be mentally occupied with their family issues and allocate more time to physically caring for the family. Lundberg and Rose (2000, 2002) find that care for a larger number of children is associated with a substantial

[3]For example, in a more general setting, Jones (1991, p. 106) states that "child care provision by the unemployed would reduce the time available to look for work".

[4]For example, by announcing a takeover deal, a CEO may secure their job at least in the medium term since their replacement during a pending merger may adversely affect firm value (Schubert and Strych, 2020). In a similar way, since investments made by an incumbent CEO are (partially) irreversible as the value of capital goods cannot be (fully) recovered by reselling them, undertaking a CEO-specific investment makes shareholders more dependent on the incumbent.

surge in the time devoted to parenthood (including fatherhood).[5] Such a commitment to family duties also applies to senior executives despite the pressures resulting from their professional responsibility.[6] We therefore expect that an increase in the household size leads to job distraction and reduces the time a CEO can devote to their professional role. The capital investment process imposes a private cost on the CEO as managing it takes valuable time. This may result in a reduced level of attention that can be devoted to scrutinizing investment choices, which is predicted to lead to a negative relationship between the number of children and the value added by investment projects or the efficiency of investment decisions.

We first sketch a simple model of managerial choices with the number of CEO children as the main variable of interest. At the beginning, the CEO makes the investment decision as well as chooses the level of investment effort and the risk of the firm's assets. Subsequently, a random shock to the firm's profit is realized and observed by the firm's shareholders. Based on the observed profit realization, shareholders decide whether to retain or dismiss the CEO. The latter happens if the CEO turnover cost (which is a function of firm size (Taylor, 2010)) is lower than the erosion of the company value resulting from the CEO retention.

The key prediction of the model is that the level of corporate investment is positively affected by the number of CEO children. Using hand-collected data for CEO children in the S&P 500 constituent firms between 1998 and 2018, we find that firms run by CEOs with more children indeed have higher capital expenditure, are more prone to engaging in large investment activities, and are more likely to pursue mergers and acquisitions (M&As). Specifically, one additional CEO's

[5]E.g., Higgins, Duxbury, and Lyons (2010) show that there has been a significant increase in the proportion of dual-earner families, for which parental responsibilities are shared more equally between both partners. This trend, in turn, results in an increasing number of men seeking to be more actively engaged in family roles and child upbringing (Duckworth and Buzzanell, 2009; Evans, Carney, and Wilkinson, 2013).

[6]Groysberg and Abrahams (2014) draw on interviews with 4,000 executives worldwide and demonstrate that executives endeavor to engage meaningfully with both work and family/community. Having interviewed 35 executives, Sahadi (2019) shows that CEOs allocate a significant amount of time to coordinating classes and schedules of their children, responding to texts from them as well as attending school events and field trips.

child is associated with a 1.1% increase in the probability of incurring a large capital expenditure and a 1.7% higher probability of undertaking an M&A deal, corresponding to a 12% and 5% increase, respectively, over the unconditional likelihood of these transactions being undertaken.[7]

In line with the model predictions, CEOs with more children tend to overinvest. As a result, their investment decisions are also less sensitive to the value of the firm's growth opportunities. Both results indicate that the higher number of children tends to be associated with less efficient resource allocation decisions and a greater departure of investment decisions from the shareholder value maximization principle. Further regression analysis indeed confirms that market participants react more negatively to investment decisions made by CEOs with a higher number of children. In addition, when these CEOs engage in M&A activities, the cumulative abnormal return is significantly more negative surrounding the announcement period, suggesting that the firm's investors perceive the deals they enter into as less value-enhancing or, even, value-destroying.

We find empirical support also for the prediction that parent CEOs tend to reduce firm risk, which translates into lower earnings volatility. Finally, we show that the positive relationship between the number of CEO children and corporate investment is mainly driven by firms with a low quality of corporate governance but is less pronounced for firms that face tighter financial constraints.

Overall, our findings strongly indicate that the size of a CEO's family affects the size and risk of the company under their management. We demonstrate that the number of a CEO's children is positively associated with the size of corporate investment but negatively correlated with its value. CEOs with more children also tend to choose less risky corporate policies. We therefore contribute to the relatively under-explored area of research on the effects of CEO family attributes

[7]We acknowledge and address the potential endogeneity concerns in the Online Appendix. Specifically, we handle potential consequences of the lack of random assignment of CEOs by employing an instrumental variable approach and using CEO turnover as a form of firm-specific shock.

on firm resource allocation decisions. By doing so, and combining insights from such areas as family studies, upper echelons theory and agency theory, we fill a significant void in the management and finance literature.

The remainder of the paper is organized as follows. Section 2 introduces the model of managerial choices and discusses hypothesis development. Section 3 describes the data and presents summary statistics. In Section 4 we discuss main empirical findings, while in Section 5 we provide conclusions, discuss the paper's contribution, and suggest avenues for future research.

2 A simple model and hypotheses development

We derive testable hypotheses by developing first a simple model of managerial choices. There are three time points $t \in \{1, 2, 3\}$, as shown in Figure 1. At $t = 1$, the CEO decides on the level of (irreversible) investment I, effort a, and the risk of firm's assets σ to maximize their personal expected payoff. At $t = 2$, that is, once investment, effort and risk levels are committed to, random profitability shock $\tilde{x}$ is realized. At $t = 3$, shareholders decide whether to dismiss or to retain the CEO, based on the CEO's choice of I and a as well as the observed realization x of the profitability shock. Conditional on not being dismissed, the CEO receives fixed salary w and a share κ of the firm's equity. The (gross) profit of the firm depends positively on the level of investment, effort and the profitability shock, and is given by $\log(I)\,(\log(a) + x)$. Random variable $\tilde{x}$ is normally distributed with mean $b\sigma^2$ and standard deviation σ. Parameter $b \geqslant 0$ captures the notion that more risky projects may earn a higher expected return. The CEO incurs personal cost of effort, which increases with the level of investment and the number of children n, due to more limited attention and a higher opportunity cost of time. The cost of effort is given by $k\sqrt{1+n}a^2(I/a)^\theta$, where $\theta \geqslant 0$ captures the degree of external capital market scrutiny (e.g., Tufano, 1998) and/or

monitoring imposed by shareholders that curbs the CEO's (excess) investment, and $k > 0$ is a scaling parameter.[8] In addition, the CEO bears the cost of reducing the firm's risk, which is captured by function by $v\sigma^{-\delta}$, where $v > 0$ and $\delta > 0$ are scaling parameters (Guo and Ou-Yang, 2006). Finally, when shareholders decide to terminate the CEO's employment contract, the CEO's dismissal payoff is $-m\exp(n)$, with $m > 0$, which reflects the fact that the negative consequences of being fired increase with the number of children, also due to more limited time available for job search. The timeline of actions and relevant events is summarized in Figure 1.

[Insert Figure 1 about here]

The expected payoff $\mathcal{U}$ of the CEO can therefore be written as

$$\begin{aligned}\mathcal{U} \;=\; & \underbrace{Prob(\text{Retention})\left[w+\kappa\log(I)\left(\log(a)+\mathbb{E}\left[x|\text{Retention}\right]\right)\right]}_{\text{Expected payoff from continuation as CEO}} \\ & +\underbrace{\left(1-Prob(\text{Retention})\right)\left(-me^{n}\right)}_{\text{Expected payoff from dismissal}}-\underbrace{k\sqrt{1+n}a^{2}(I/a)^{\theta}}_{\text{Cost of effort}}-\underbrace{v\sigma^{-\delta}}_{\text{Cost of reducing risk}}. \end{aligned} \tag{1}$$

The CEO chooses the levels of investment I, effort a, and firm risk σ at $t = 1$. At $t = 2$, realization x of the random profitability shock is observed. After observing x, at $t = 3$, if shareholders decide to retain the CEO, the value of the firm to them is

$$(1-\kappa)\left(\log(a)+x\right)\log(I)-w. \tag{2}$$

If shareholders decide to dismiss the CEO, the total incremental payoff to shareholders is $-cI$, with $c > 0$. The cost of CEO turnover therefore increases with the firm size (e.g., in line with Taylor (2010), where the CEO turnover cost is a constant fraction of the book value of the firm's assets).

[8] Higher θ is therefore equivalent to the personal cost of investment, relative to effort spent, increasing more quickly.

Components of such a cost are, for example, severance or retirement packages and search fees paid for finding a replacement. Non-monetary costs include a reduction in value of manager-specific investment projects, which are worth more with the incumbent rather than with under the next-best alternative manager (Shleifer and Vishny, 1989), as well as directors' personal costs of losing an ally (Taylor, 2010), a loss in the firm's social capital as a result of the CEO's social networks and relationships, increased uncertainty over the firm's prospects under a new management team, and possible disruptions in customer-supplier relationships given that large firms are more likely to have dependent suppliers.

Shareholders retain the manager when the profitability shock is sufficiently large, that is, when shareholders' profit is (weakly) higher than the payoff resulting from the CEO dismissal:

$$(1-\kappa)\left(\log(a)+x\right)\log(I)-w \geqslant -cI, \tag{3}$$

Condition (3) is equivalent to

$$x \geqslant \frac{w-cI}{(1-\kappa)\log(I)}-\log(a) \equiv \overline{x}, \tag{4}$$

where $\overline{x}$ is the minimum level of the profitability shock that guarantees the CEO survival. The probability of retention (which is a function of a, I, and σ) is therefore given by

$$Prob(\text{Retention}) = 1-\Phi\left(\frac{\overline{x}-b\sigma^2}{\sigma}\right), \tag{5}$$

where $\Phi(\cdot)$ denotes the standard normal CDF. It is also possible to write down the expectation

$$\mathbb{E}\left[x|\text{Retention}\right] = \mathbb{E}\left[x|x \geqslant \overline{x}\right] = \sigma \frac{\phi\left(\frac{\overline{x}-b\sigma^2}{\sigma}\right)}{1-\Phi\left(\frac{\overline{x}-b\sigma^2}{\sigma}\right)}, \tag{6}$$

where $\phi(\cdot)$ denotes the standard normal PDF.

Maximizing (1) with respect to I, a, and σ, with (5) and (6) defining the probability of CEO retention and the conditional expectation of the profitability shock, respectively, yields the solution to the manager's problem, that is, the set of the CEO's optimal choices I^*, a^*, and σ^*.

Due to the relatively complex structure of the problem, the analytical evaluation of relevant derivatives is not possible. We therefore resort to an extensive numerical search. For a broad set of parameter values, the key relationships in the model have the following signs: $\frac{\partial I^*}{\partial n} > 0$, $\frac{\partial a^*}{\partial n} < 0$, and $\frac{\partial \sigma^*}{\partial n} < 0$.[9] In addition, we can define the optimal (from shareholders' perspective) level of investment I^{**}, which maximizes shareholders' expected net payoff, as $\log(I)\left(\log(a^*) + b{\sigma^*}^2\right) - I$, given managerial choices a^* and σ^*. It can be numerically shown that, in general, $\frac{\partial I^{**}}{\partial n} < 0$. Combined with the observation that $\frac{\partial I^*}{\partial n} > 0$, one can demonstrate that $\frac{\partial (I^* - I^{**})}{\partial n} > 0$, in which $I^* - I^{**}$ captures the degree of overinvestment. Furthermore, the incremental Tobin's q, here defined as $\log(I^*)\left(\log(a^*) + b{\sigma^*}^2\right)/I^*$, decreases with n through the effect of I^*, a^*, and σ^*. Finally, it also holds that the sign of cross-derivative $\frac{\partial^2 I^*}{\partial n \partial \theta}$ tends to be negative as well; that means that the effect of the number children on corporate investment is weaker when a CEO's actions are disciplined to a greater extent (so for higher n, the sensitivity of investment to θ is more negative as well). These above-mentioned relationships are jointly illustrated in Figure 2. From that figure, it can be seen that apart from investment level I^*, which increases with the number of children, both remaining decision variables (a^* and σ^*) as well as relevant economic quantities (Tobin's q,

[9] Although we have managed to identify parameter configurations for which the reported signs of derivatives do not hold, they appear to represent rather extreme economic scenarios.

optimal investment, and the effect of constraints) *decrease* with n.

[Insert Figure 2 about here]

As discussed earlier, parenting more children is associated with i) the CEO's greater financial responsibility and, as a consequence, higher expected unemployment costs, and ii) a higher opportunity cost of effort. Based on the results of the model, we conclude that CEOs respond in three different ways to these changes of their economic situation.

Firstly, a higher number of children increases the CEO's financial responsibility and the expected unemployment costs. Therefore, the CEO pursues a more aggressive growth and acquisition strategy to manage a bigger firm in order to increase their entrenchment. Based on this result ($\frac{\partial I^*}{\partial n} > 0$), we formulate the following hypothesis:

Hypothesis 1 *The number of a CEO's children positively affects the level of corporate investment.*

As the CEO is more likely to take actions to become more indispensable and entrenched by investing beyond what is optimal from the shareholders' value-maximization perspective ($\frac{\partial (I^* - I^{**})}{\partial n} > 0$), we predict that:

Hypothesis 2 *The number of a CEO's children positively affects the degree of corporate overinvestment.*

Secondly, a higher opportunity cost of effort results in a (more) limited attention and lower effort levels ($\frac{\partial a^*}{\partial n} < 0$), which demonstrate themselves in suboptimal decisions regarding investment and acquisition policy. Such second-best decisions are expected to be penalized by the capital market at the time of their announcement. As the effective cost of managerial effort and the degree of inattention resulting in poorer investment decisions are expected to increase with the number of children, the following hypothesis follows:

Hypothesis 3 *Investors respond more negatively to new investments made by CEOs with more*

children.

Thirdly, an additional way to lower the employment risk is to pursue a less risky corporate strategy. Therefore, CEOs with more children may seek to lower the volatility of the company's assets to avoid extreme adverse outcomes leading to their dismissal ($\frac{\partial \sigma^*}{\partial n} < 0$), which is captured by Hypothesis 4:

Hypothesis 4 *Company's earnings volatility is negatively related to the number of CEO's children.*

Finally, we expect that the effect of children on corporate investment will be weaker when CEO's actions are monitored to a greater extent by better corporate governance system, and are exposed to more scrutiny of external capital markets ($\frac{\partial^2 I^*}{\partial n \partial \theta} < 0$). Conversely, weaker corporate governance or better access to external financing are expected to increase the CEO's ability to unilaterally affect the corporate policy. Consequently, we hypothesize the following:

Hypothesis 5 *The effect of the number of CEO's children on investment is stronger when corporate governance is weaker but also when the degree of financial constraints is lower.*

3 Sample and data

3.1 Sample construction

We collect names of CEOs from the Compustat Executive Compensation (ExecuComp) database based on the CEO title (data item CEOANN) for the S&P 500 firms from 1998 to 2018. We retrieve family information for CEOs from Marquis Who's Who in Finance and Industry, Standard and Poor's Register of Directors and Executives, the Notable Names Database (NNDB.com), Wall Street Journal, New York Times, and Google search as a last resort. For example, we search the Internet using Google with CEO name and keywords such as "wife", "husband", "spouse", "married", "children", "son" and "daughter". We record the number of children (including stepchildren)

a CEO has. For CEOs for whom marriage and family information is available in Marquis Who's Who or NNDB.com but no children information is found, we record the number of children as zero. Single CEOs are recorded as having zero children as well.[10] CEOs whose personal information is not available in the public domain are not included in the sample.

We are able to retrieve marriage and family information for 432 CEOs out of 1,312 CEOs for the S&P 500 firms within the sample period.[11] We extract financial and accounting information from Compustat's Industrial files and obtain stock return data from the Center for Research in Security Prices (CRSP). Mergers and acquisitions (M&A) data are downloaded from the Thompson Reuters Financial Securities Data Corporation's (SDC) Mergers and Acquisitions database. We rely on ExecuComp database for CEO compensation data.

3.2 Measures of corporate investment activity

The key purpose of our analysis is to understand the effect of the number of children a CEO has on their propensity to increase the firm size. Our main explained variables related to corporate expansion policies are capital expenditures and acquisition activities. $CAPEX\_AT$ is a firm's capital expenditure scaled by its total assets. We also look specifically at large corporate investment projects since large and lumpy investments typically require more CEO involvement (Pan, Siegel, and Yue Wang, 2020). $CAPEX10$ is a dummy variable equal to one if $CAPEX\_AT$ is more than 10% (which is more than two times the mean of $CAPEX\_AT$), and zero otherwise. Since CEOs can exert significant decision-making power in the context of M&As (Bernile et al., 2017; Billett and Qian, 2008), corporate decisions to engage in acquisition activities may reflect CEOs'

[10] Our conclusions remains unaltered if we exclude single or female CEOs. In addition, main findings are robust to replacing the CEO children number with a dummy variable – which is equal to one if a CEO has more than three children and zero otherwise as well as an alternative measure of M&A activity (see Online Appendix).

[11] The coverage rate is similar to Bernile, Bhagwat, and Rau (2017). They report that information for around one third of CEOs from S&P Composite 1500 firms can be found in public sources.

managerial preferences to entrench themselves, by expanding the scope of their control or obtaining a diversification premium (Aggarwal and Samwick, 2003; Rose and Shepard, 1997; Shleifer and Vishny, 1988).[12] CEOs can secure their position at least in the medium term since replacing a CEO during a pending merger is detrimental to firm value (Schubert and Strych, 2020). Therefore, we employ an indicator variable, MA_Deal, which is equal to 1 if there are any M&A deals in a given firm-year and 0 otherwise, to examine the effect of CEO family size on the firm's tendency to participate in M&A activities. Following the M&A literature (e.g., Lee, Mauer, and Xu, 2018), we require that the deal be classified as a merger, an acquisition of majority interest, or an acquisition of assets. We also remove deals that are worth less than USD 1 million.

3.3 Summary statistics

Panel A of Table 1 presents the sample distribution of the number of children. For most firm-years, the number of CEO children is either 2 (39.17%) or 3 (29.96%). The sample distribution of CEO children is consistent with Cronqvist and Yu (2017). Panel B shows the mean, standard deviation, and quartiles of firm-related variables and CEO characteristics. The median number of children is 3. In line with Ferrell, Liang, and Renneboog (2016) and Bernile et al. (2017), the capital expenditure-to-assets ratio has a mean of 0.045 and the average percentage of firm-years for which M&A deals are observed is 34.3%. The average probability of a large capital expenditure is 9.7%.

[Insert Table 1 about here]

[12] From the agency perspective, managers diversify to reduce idiosyncratic risk and capture private benefits.

4 Empirical findings

4.1 CEO children and investment level

To empirically examine Hypothesis 1, we estimate the following model:

$$y_{it} = \alpha + \delta Children_{it} + \beta X_{it} + \eta_j + \eta_t + \epsilon_{it}, \tag{7}$$

where subscripts i, j and t represent a firm, industry, and year, respectively. The industry fixed effects (η_j) are based on a 3-digit SIC code to control for unobserved industry-specific heterogeneity, and year fixed effects (η_t) control for concomitant economic trends or economic shocks.[13] The error term is denoted by ϵ_{it}. The dependent variable y_{it} is a measure of a firm's expansionary policies. In particular, we investigate the effect of the number of a CEO's children on capital expenditures-to-assets ratio ($CAPEX\_AT$), the propensity to implement large capital expenditures ($CAPEX10$), and firm acquisitiveness (MA_Deal). We employ an ordinary least squares (OLS) model for $CAPEX\_AT$ and probit regression models for $CAPEX10$ and MA_Deal.[14] The coefficient of interest is the effect of the number of children, δ. Vector X_{it} represents control variables that may correlate with the firm's investment policies. Following standard investment literature (e.g., Alti, 2003; Fazzari, Hubbard, and Petersen, 1988), we control for investment opportunities as proxied by market-to-book ratio (MTB) at the beginning of the year (Chen and Chen, 2012) and cash flow ($CashFlow$) as a measure of a firm's internal funds. We also include firm size (measured as the natural logarithm of total assets, Log_AT), returns on assets (ROA) and sales growth ($SalesGrowth$) in the regression to account for the firm's operating performance. CEO

[13] Due to low variability of the number of children for a given CEO-firm pair, the inclusion of a firm or a CEO fixed effect would not be appropriate.

[14] The results are robust to the alternative *logit* estimation. We choose probit as it facilitates the implementation of the instrumental variables approach.

age ($ExeAge$) and age squared are included to account for the effect of a CEO's career concerns (Bernile et al., 2017) and retirement preferences (Jenter and Lewellen, 2015). A female CEO dummy variable ($FemaleCEO$) is included since there is evidence that female managers are less prone to making aggressive decisions (e.g., Chen, Crossland, and Huang, 2016; Palvia, Vähämaa, and Vähämaa, 2015). We also control for CEO tenure ($Tenure$) as its longer duration increases the likelihood of a CEO being entrenched (Hill and Phan, 1991; Morck, Shleifer, and Vishny, 1988; Tsai, Kuo, and Hung, 2009). Stock ownership ($StockOwnership$) represents a CEO's total holdings of company stock and options and has been demonstrated to have an impact on the firm's investment policy, capital structure, and risk (e.g., Coles, Daniel, and Naveen, 2006). Lastly, as the number of a CEO's children may reflect their innate personality (for example, an inherently confident CEO may believe in their parenting skills), we include a proxy for CEO overconfidence ($OverConfidence$) that gauges their tendency to retain vested deep in-the-money options, as in Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011) and Humphery-Jenner, Lisic, Nanda, and Silveri (2016). The definitions of all variables used in the analysis are listed in the Appendix. After removing missing values in the control variables set, we are left with 3,089 firm-year observations. For all panel OLS regressions, we employ Driscoll and Kraay (1998) standard errors that are robust to general forms of cross-sectional and temporal dependence with autocorrelation up to 2 lags. For probit estimation, standard errors are clustered at the CEO-firm level to adjust for autocorrelation of firm policies within a CEO-firm pair (Petersen, 2009).

We report the estimation results of Eq. (7) in Table 2. In column (1), the OLS estimation results are reported. The coefficient of $Children$ in $CAPEX\_AT$ regression equals 0.002 and is statistically significant at the 1% level (p-value < 0.01). The effect is also economically significant. Given that the unconditional mean of $CAPEX\_AT$ is 0.045, one additional child a CEO has is expected to lead to a 4.44% increase in the capital expenditure-to-assets ratio. In columns

(2) and (3), the coefficient on *Children* of $CAPEX10$ or MA_Deal is positive and statistically significant at the 5% level (p-values of 0.015 and 0.024, respectively), indicating that CEOs with more children are more likely to engage in corporate expansion. To provide economic interpretation of the coefficient estimates, we calculate the average marginal effect of *Children* on the probability of engaging in large investment projects and M&A deals, holding all other variables at their sample mean. As shown by $dydx(Children)$, the marginal effect on $CAPEX10$ (MA_Deal) is 0.011 (0.017), which suggests that one additional child that a CEO has is associated with a 1.1% (1.7%) increase in the probability of incurring a large capital expenditure (engaging in an M&A activity). This represents a 11% (5%) increase over the unconditional likelihood of a large capital investment (M&A deal) occurring. For other explanatory variables, in line with the investment literature, (e.g., Fazzari et al., 1988), both market-to-book ratio and cash flow have a positive and significant effect on $CAPEX\_AT$. Taken together, these findings are consistent with Hypothesis 1 and demonstrate that the number of a CEO's children positively affects the level of corporate investment.

We also consider the possibility that the relation between CEO children and investment stems from the omitted variables or the potential sorting of CEOs into firms with more demand for aggressive investment and M&A strategies (endogenous matching), which can raise potential endogeneity concerns. We address this point by 1) instrumenting CEO children with the state-level support for raising a child, and 2) examining whether the change of the number of CEO children following a CEO turnover alters the investment policy (both sets of results are described in the Online Appendix). In general, we demonstrate that the coefficients of *Children* remain positive for all measures of corporate investment after adopting the instrumental variables approach, and that the appointment of a CEO with more children than their predecessor leads to an increase in corporate investment.

[Insert Table 2 about here]

4.2 CEO children and overinvestment

We test Hypothesis 2 and investigate the relationship between the number of CEO children and firm-level investment efficiency. We employ the measure of investment efficiency based on Chen, Hope, Li, and Wang (2011). Specifically, we use deviations of the actual investment from its expected level, defined as the predicted value from the regression of $CAPEX\_AT$ on the revenue growth:

$$CAPEX\_AT_{it} = \tag{8}$$
$$\alpha_0 + \alpha_1 SalesGrowth_{i,t-1} + \alpha_2 SalesGrowth_{i,t-1} \times Neg_{i,t-1} + \alpha_3 Neg_{i,t-1} + \eta_j + \eta_t + \epsilon_{it},$$

where Neg is a dummy variable equal to 1 for $SalesGrowth < 0$ and 0 otherwise. We estimate the investment model cross-sectionally for each of the Fama-French 48 Industry Portfolios, and $OverInvest_{it}$ is defined as the residual from regression (9).[15] To reduce the scope for measurement error, we also create a binary variable $D\_OverInvest$, which is equal to 1 if $OverInvest$ is positive, and 0 otherwise. As in Chen et al. (2011), we use asset tangibility ($Tangibility$) and financial slack ($Cash\_AT$) as additional control variables. The effect of the CEO children number on the propensity to overinvest is shown in columns (1) and (2) of Table 3. The estimated coefficient of $Children$ is positive and significant for both $OverInvest$ and $D\_OverInvest$ regressions (p-values less than 0.05 for both), indicating that firms led by CEOs with a larger number of children are more apt to invest above the optimal level as predicted by sales growth.

[15] A more negative value of $OverInvest$ (a higher level of underinvestment) implies lower propensity to engage in overinvestment.

[Insert Table 3 about here]

We supplement the above analysis by resorting to the investment-q framework, similar to McLean, Zhang, and Zhao (2012), in which the capital allocation efficiency is expressed as the investment sensitivity to growth opportunities as proxied by Tobin's q. Although it is common to use the market-to-book ratio as a measure of growth opportunities, it has been pointed out that Tobin's q defined in such a way may not be a valid proxy for the marginal value of capital (Bartlett and Partnoy, 2018; Dybvig and Warachka, 2015; Erickson and Whited, 2000, 2012). Hence, we also employ the alternative measure of growth opportunities proposed by Peters and Taylor (2017), which is computed as the firm's market value divided by total capital (physical plus intangible capital).[16] In columns (3) and (4) of Table 3, we present the evidence using the market-to-book ratio (denoted as MTB) and Peter and Taylor's q (denoted as QPT), respectively. The estimated coefficient of $Children \times QPT$ is negative and statistically significant at the 1% level (with the estimate of $Children \times MTB$ also displaying a negative sign, while being not significant due to a higher standard error). Overall, we conclude that a higher CEO children number has a negative effect on the sensitivity of investment to growth opportunities, that is, is associated with lower investment efficiency.

4.3 CEO children and the value of investment

To provide empirical evidence for Hypothesis 3, we investigate the relation between the number of CEO children and the value of investment through the effort level channel. We draw on the market assessment of investment as a proxy for CEO's effort, and examine whether the number of children affects the contribution of capital expenditure and M&A activity to shareholder value.

[16]Peters and Taylor (2017) argue that incorporating both physical and intangible capital stock into the denominator of Tobin's q can explain a large fraction of the variation of both intangible and physical investments.

To this end, we follow Masulis, Wang, and Xie (2009), who employ a similar framework to the one used by Faulkender and Wang (2006) for the analysis of the market value of cash holdings. We regress stock returns on a set of variables that includes the interaction term of CEO children number and the change in capital expenditure:

$$r_{it} - R^B_{it} = \alpha + \delta_1 \frac{\Delta Capex_{it}}{MktCap_{i,t-1}} \times Children_{it} + \delta_2 Children_{it} + \delta_3 \frac{\Delta Capex_{it}}{MktCap_{i,t-1}} + \gamma X_{it} + \eta_j + \eta_t + \epsilon_{it}, \quad (9)$$

where the dependent variable is the excess stock return, $r_{it} - R^B_{it}$, defined as the difference between the stock return for firm i during fiscal year t and stock i's benchmark return in year t. We use both industry-adjusted excess return (RET_IND) and market-adjusted excess return (RET_MKT) as proxies for $r - R^B$. $\frac{\Delta Capex_{it}}{MktCap_{i,t-1}}$ is the change in capital expenditure divided by the market value of equity at the beginning of year. As the variable is scaled by market capitalization, δ_3 captures the dollar change in shareholder wealth for one dollar increase in capital expenditure. Coefficient δ_3 is not necessarily positive and can be negative if investors perceive the firm's capital expenditure as having a negative net present value. The coefficient of interest is δ_1, which measures the effect of CEO children number on the market valuation of capital expenditure. As in Masulis et al. (2009), we include as control variables leverage in fiscal year t, net financing in fiscal year t, change in R&D, earnings, dividends, interest, and net assets, all scaled by the market capitalization in fiscal year $t-1$. Columns (1) and (2) of Table 4 present the regression results of capital expenditure analysis. We find that, although the contribution of capital expenditure to shareholder value is statistically not significant, the effect of CEO children number on this contribution is negative and statistically significant as evidenced by the negative and significant coefficients of $\frac{\Delta Capex_{it}}{MktCap_{i,t-1}} \times Children$ (p-values of 0.01 for both RET_IND and RET_MKT). Economically, the contribution of one extra dollar in capital expenditure to industry-adjusted (market-adjusted) shareholder value is lowered

by 0.39 (0.42) dollar when a CEO has one additional child.

[Insert Table 4 about here]

We further proceed to study the effect of CEO children number on the market valuation of mergers and acquisitions. We use as the dependent variable cumulative abnormal returns over the 7- and 11-day windows. We compute the announcement-period cumulative abnormal returns using the four-factor Fama and French (1993) and Carhart (1997) model.[17] CAR(-3,+3) and CAR(-5,+5) are the acquirer's cumulative abnormal returns over the 7- and 11-day windows of $(t-3,\, t+3)$ and $(t-5,\, t+5)$, respectively. We include all firm-specific and CEO-specific control variables in the previous year, we also control for a wide array of deal-specific features such as merger occurring between firms from the same industry (*Related*), stock purchase versus cash deal (*StockPurchase*), an indicator variable for public target (*PublicTarget*), and the logarithm of deal value (*Log_DealValue*).[18] The estimation output is presented in columns (3) and (4) of Table 4. The coefficients on *Children* are all negative and significant for both CAR(-3,+3) and CAR(-5,+5) (p-value < 0.05 for both), further indicating that CEOs with more children are indeed more likely to engage in value-reducing acquisition deals.

4.4 CEO children and firm risk

CEOs are more risk-averse than diversified shareholders since they, besides owning stock or stock options of the company, have their human capital tied to the firm (Fama and Laffer, 1972). Our model predicts that a CEO with a higher number of children will choose projects that generate stable cash flows in order to reduce the probability of a sufficiently large adverse profit outcome

[17] The four-factor model parameters are estimated using 150 trading days of return data ending 11 days before the merger announcement.

[18] We are left with 565 deals after removing observations with missing values in our control set.

that would lead to a dismissal. In this section, we test Hypothesis 4, which states that a company's earnings volatility is negatively related to the number of CEO children, and regress earnings and sales volatility on the number of CEO children. We measure earnings (sales) volatility as the standard deviation of quarterly earnings (sales) per share over the previous 20 quarters. Specifically, we re-estimate Eq. (7) with volatility measures as the explained variable. The results are presented in Table 5.

[Insert Table 5 about here.]

Table 5 shows a negative and statistically significant relationship between *Children* and earnings and sales volatility. The coefficient estimate on *Children* in column 1 is -0.010 (p-value = 0.03), meaning that one additional CEO child is associated with a reduction of the firm's earnings-per-share (EPS) volatility by 2.1% compared to the average firm (with the unconditional mean being 0.475). Also, the coefficient for the sales volatility is negative and statistically significant at the 10% level. It therefore lends support to Hypothesis 4, demonstrating that the larger number of children results in CEOs choosing projects associated with more stable earnings and revenues.

4.5 The role of corporate governance and financial constraints

Finally, we test Hypothesis 5 and explore potential moderating effects of the quality of corporate governance and the degree of financial constraints on the relation between CEO children number and investment policies. Table 6 shows the estimation results regarding the impact of CEO children on investment for subsamples partitioned based on the quality of corporate governance (Panel A) and financial constraints indices (Panel B).

As known from agency theory, CEOs have incentives to engage in potentially value-destroying activities, such as empire building and private benefit extraction. Therefore, adequate corporate

governance structures must be in place to prevent CEOs from engaging in undesirable, from shareholders' perspective, behavior. To explore the role of corporate governance, we identify subsamples based on the (1) corporate governance G-index (Gompers, Ishii, and Metrick, 2003) and (2) CEO duality, which occurs when a CEO is also the chairman of the board. We expect that better corporate governance translates into more effective monitoring in limiting managerial discretion to undertake inefficient projects and thereby increases the costs of (unilaterally) adjusting investment levels.[19] First, we divide the sample based on Gompers et al.'s (2003) corporate governance index (G-index). Panel A (upper half) shows that the positive relation between CEO children number and corporate expansion is more pronounced for poorly governed firms with G-index values above the sample median (a higher value of the G-index is associated with poorer governance). As the ability of a CEO to influence a firm's decision is greater when the CEO is more powerful (Adams, Almeida, and Ferreira, 2005) and such CEO power is also an indicator of an entrenched CEO (Chen, Huang, and Wei, 2013), we subsequently partition the sample based on CEO duality. Panel A (bottom half) shows that the positive relation between the CEO children number and corporate expansion is stronger when a CEO is also the chairman, in which case they are more capable of pursuing self-serving corporate policies.

[Insert Table 6 about here]

Subsequently, we test the effect of financing constraints on the relation between the CEO children number and investment. In the presence of imperfect capital markets, firms that are more financially constrained (lacking internal funds) tend to exercise more caution when making investment decisions (Almeida and Campello, 2007; Campello, Graham, and Harvey, 2010; Fazzari et al., 1988; Whited, 2006). Firms that face more binding financing constraints are expected to have

[19]G-index is a proxy for shareholders' rights and built as an equally-weighted index of 24 corporate governance provisions complied by the Investor Responsibility Research Center (IRRC).

a lower propensity to (over)invest since managers are subject to more market scrutiny associated with obtaining external financing. We therefore expect that the relationship between the number of CEO children and corporate investment is attenuated for more constrained firms. We separate the sample based on the firm's financial constraints status. We use the WW-index (Whited, 2006) and HP-index (Hadlock and Pierce, 2010) to partition the sample. Firms with the WW-index below the sample median are classified as financially unconstrained (low WW) and the remaining ones are classified as constrained (high WW). The same rule applies to the HP-index. Panel B shows that the positive relation between CEO children number and $CAPEX\_AT$ and MA_Deal is only significant for financially unconstrained firms.[20]

5 Discussion and conclusions

The goal of the paper is to a provide theoretical explanation and empirical evidence of the relation between the CEO children number and corporate investment as a key resource allocation decision. According to the agency view, CEOs with more children are more likely to extract private benefits by growing the firm size and increasing corporate resources under their control. In line with that view, we find that the higher number of CEO children is associated with larger capital investment expenditure and a higher likelihood of undertaking large investment projects and M&As. This higher magnitude of investment expenditure is symptomatic of overinvestment, with investment being less sensitive to the firm's growth opportunities and are more negatively perceived by market participants. Furthermore, we demonstrate that the higher number of children results in CEOs favoring lower earnings volatility. Our subsample analysis indicates that the additional

[20]Even though the two-tailed p-value for the coefficients on $Children$ for $CAPEX10$ do not imply statistical significance at the 10% level for either constrained or unconstrained firms partly due to the loss of variation in a subsample of firms, one-tailed p value are less than 10% only for unconstrained firms. Also, we are able to observe that the economic size of coefficients are greater for unconstrained firms.

investment expenditure resulting from a higher number of children is higher for firms with weaker corporate governance but also lower financing constraints.

To the best of our knowledge, this is the first paper to explore whether and how the number of a CEO's children affects investment decisions of the business they manage. We build on the insights of upper echelons and principal-agent theories and argue that the demonstrated changes to investment policy are the CEO's optimal responses to the their greater non-financial and financial responsibility, expected unemployment cost and the cost of effort resulting from a higher children number. By doing so, we recognize that personal considerations of executives may play a prominent role in shaping corporate outcomes (e.g., Cronqvist and Yu, 2017; Dahl et al., 2012). At the same time, our research findings indicate that corporate boards should consider putting in place support networks (e.g., by creating supportive corporate culture with trusted colleagues and emotionally intelligent board, permissions to travel or relocate selectively, provisions of counseling services) to mitigate the adverse effects of CEO family size on corporate strategic decision making.

The paper contributes to the extant literature in several ways. First, we demonstrate that the number of children is one of the key CEO family attributes that influences their investment decisions. At the individual level, Cohn, Lewellen, Lease, and Schlarbaum (1975) and Sunden and Surette (1998) show that married individuals tend to reduce their risk exposure and hold a lower proportion of risky assets in their portfolios compared to single ones. Love (2010) concludes that households with children hold riskier portfolio shares though the relationship reverses in retirement. Liu, Shu, Sulaeman, and Yeung (2020) and Betzer, Limbach, Rau, and Schürmann (2021) find that the death or divorce of a fund manager's parents during childhood is associated with lower risk tolerance. At the corporate level, Roussanov and Savor (2014) find that married CEOs are more conservative as manifested in pursuing less aggressive investment policies and Hegde and Mishra

(2019) show that married executives are more committed to pro-social behavior.[21]

Although the predisposition of an individual can be affected by several family attributes, the effect of the number of children on managerial decisions has remained largely unexplored so far. Bucciol and Miniaci (2011) report a negative correlation between the number of children and risk tolerance whereas Jianakoplos and Bernasek (1998) and Bertocchi et al. (2011) find that the effect of having children is significantly positive for males and weakly negative for females. In the context of corporate outcomes, Dasgupta, Ha, Jonnalagadda, Schmeiser, and Youngerman (2018) show an increased likelihood of women joining the corporate board in firms run by CEOs with a daughter compared to CEOs without one. Dahl et al. (2012) show that CEOs become less generous to their employees after the birth of their first child. Cronqvist and Yu (2017) find that CEOs that have a daughter exhibit higher scores in pro-social practices related to environmental issues and employee relations.[22] Our study contributes to this strand of literature, which explores the effect of being a parent on a CEO's decision making and shows that the presence of children and family size significantly affect the CEO's corporate investment behavior.

Furthermore, our paper adds to the burgeoning literature that integrates the theory of upper echelons and explores how managerial styles related to personal experiences such as marital status (Roussanov and Savor, 2014), holding a pilot's license (Sunder, Sunder, and Zhang, 2017), military experience (Benmelech and Frydman, 2015; Koch-Bayram and Wernicke, 2018), early-life disaster experiences (Bernile et al., 2017; O'Sullivan, Zolotoy, and Fan, 2021), religion (Liu and Luo, 2021; Worden, 2005), and political affiliation (Chin et al., 2013; Hutton, Jiang, and Kumar, 2014) impact firm outcomes. We emphasize the role of the family environment of a CEO and link the number

[21] In contrast, Grable (2000) find that married individuals exhibit higher risk tolerance than single individuals, while Agnew, Balduzzi, and Sunden (2003) and Bertocchi, Brunetti, and Torricelli (2011) report that married respondents have a higher propensity to invest in risky assets.

[22] Although Cronqvist and Yu (2017) include the number of children as a control variable, it does not show a statistically significant impact on the firm's CSR.

of children to the investment choices they make for their firms. Also, this paper contributes to the agency-theoretic approach, in which corporate investment decisions are motivated by managers' desire to enhance their personal utility rather than to maximize the value of the firm.

By underscoring the concept of executives' family characteristics, the paper offers the basis of a host of future research avenues. First, the presented empirical analysis can be extended to include the types of *target companies* CEOs with more children attempt to take over. CEOs with a larger number of children may acquire firms that have social connections to them to make their dismissal more costly. Second, the natural follow-up question is whether the *gender* of CEO's children influences the investment decisions, and whether the number of children is related to the *gender pay* gap observed between male and female executives. Having demonstrated that CEOs' dispositions and the corresponding corporate actions are influenced by the number of their children, our study also points to the research agenda examining other channels through which the number of CEO children, and personal circumstances more generally, shapes firm policies; examples include shareholder litigation rights, industry competition and CEO labor market tightness. Finally, future research could explore a greater variety of firm outcomes and choices, such as talent recruitment, organizational culture, competitive strategies, and corporate philanthropy.

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Appendix: Variable definitions

Panel A: Main regression variables	
CAPEX_AT	Capital expenditure (capx) scaled by total assets (at). Source: Compustat
CAPEX10	An indicator variable equal to 1 if $CAPEX\_AT > 10\%$ and 0 otherwise. Source: Compustat.
MA_Deal	An indicator variable equal to 1 if there are any M&A deals in a given firm-year and 0 otherwise. A deal must be classified as a merger, an acquisition of majority interest, or an acquisition of assets, and its value must be at least USD 1 million. Source: Thomson Reuters database.
Children	The number of CEO children. Source: Marquis Who's Who in Finance and Industry, Standard and Poor's Register of Directors and Executives, the Notable Names Database (NNDB.com), Wall Street Journals, New York Times, and Google search.
Panel B: Main control variables	
MTB	The market-to-book ratio measured at the beginning of the year and defined as the market value of assets (equal the market value of common stock (prcc_f×csho) plus total assets (at) minus total common equity (ceq) minus deferred taxes (txdb)) divided by the total value of book assets (at). Source: Compustat.
CashFlow	Income before extraordinary items (ib) plus depreciation and amortization (dp), scaled by total assets (at). Source: Compustat.
Log_AT	Natural logarithm of total assets (at). Source: Compustat
ROA	Operating income before depreciation (oibdp) divided by total assets (at). Source: Compustat.
SalesGrowth	Percentage change of sales (sale) from year $t-1$ to year t. Source: Compustat.
ExeAge	Age of CEO (age). Source: Execucomp.
FemaleCEO	An indicator variable equal to 1 if CEO is female (gender). Source: Execucomp.
Tenure	Time difference between fiscal year-end and the date an executive became CEO (becameceo). Source: Execucomp.
StockOwnership	Percentage of total shares owned (shrown_tot_pct). Source: Execucomp.
OverConfidence	An indicator variable equal to 1 if the average value per vested option scaled by the average strike price of option held by CEO is more than or equal to 0.67 for at least two years and 0 otherwise (Humphery-Jenner et al., 2016). Average value per vested option is measured as $\frac{Value\ of\ vested\ unexercised\ options}{Number\ of\ vested\ unexercised\ options}$ and average strike price is measured as stock price minus average value per vested option. Source: Execucomp and Compustat.
Panel C. Other variables	
Neg	A dummy variable equal to 1 for $SalesGrowth < 0$ and 0 otherwise.
OverInvest	A measure of overinvestment constructed using the method shown in Section 4.2.
Cash_AT	Cash and short-term securities (che) divided by total assets (at). Source: Compustat.
Tangibility	One minus the ratio of intangible assets (intan) and total assets (at). Source: Compustat.
QPT	The proxy for investment opportunities proposed by Peters and Taylor (2017). Source: Peters and Taylor (2017).
$\frac{\Delta Capex}{MktCap}$	The change of capital expenditures divided by the market value of equity at the beginning of year. Source: Compustat.

RET_IND	Industry-adjusted buy-and-hold abnormal return based on Fama French 48 industry portfolios classification. Source: CRSP daily, Fama-French data library.
RET_MKT	Market-adjusted buy-and-hold abnormal return. Market return is provided by Fama-French data library and is defined as value-weight return of all CRSP firms incorporated in the US and listed on the NYSE, AMEX, or NASDAQ that have a CRSP share code of 10 or 11. Source: CRSP daily, Fama French data library.
Leverage	Total debt (dltt+dlc) divided by the sum of total debt and the market value of equity (at-ceq+csho×prcc_f). Source: Compustat.
NetFinancing	Total equity issuance (sstk) minus repurchases of equity (prstkc) plus debt issuance (dltis) minus debt redemption (dltr). Source: Compustat.
ΔR&D	Change of R&D expenditures (xrd) (recorded as zero if missing) scaled by market capitalization in fiscal year $t-1$. Source: Compustat.
ΔEarnings	Change in profitability scaled by market capitalization in fiscal year $t-1$. Following Faulkender and Wang (2006), earnings/profitability is calculated as earnings before extraordinary items plus interest (ib+xint), deferred tax credits (txdi), and investment tax credits (itci). Source: Compustat.
ΔDividends	Change of common dividends paid (dvc) scaled by market capitalization in fiscal year $t-1$. Source: Compustat.
ΔInterest	Change of interest expense (xint) (recorded as zero if missing) scaled by market capitalization in fiscal year $t-1$. Source: Compustat.
ΔNetAssets	The difference between total assets (at) and cash (che), scaled by market capitalization in fiscal year $t-1$. Source: Compustat.
CAR(-s,+τ)	Cumulative abnormal return (CAR) of the acquirer (in percentage terms) over the window of $(t-s, t+\tau)$ estimated using the four-factor Fama and French (1993) and Carhart (1997) model. Source: CRSP daily, Fama French data library.
Related	An indicator variable equal to 1 if target company and acquiring company belong to the same industry and 0 otherwise. Source: Thomson Reuters SDC.
StockPurchase	An indicator variable equal to 1 if the payment method of the merger deal is stock and 0 otherwise. Source: Thomson Reuters SDC.
PublicTarget	An indicator variable equal to 1 if the target company is publicly listed and 0 otherwise. Source: Thomson Reuters SDC.
Log_DealValue	Natural logarithm of the deal value. Source: Thomson Reuters SDC.
STD_EPS	Standard deviation of quarterly earnings per share over the previous 20 quarters. Source: Compustat.
STD_SALE	Standard deviation of quarterly sales per share over the previous 20 quarters. Source: Compustat.
CEO duality	An indicator variable equal to 1 if CEO also has the title of chairman and 0 otherwise. Source: ExecuComp.
G-index	Corporate Governance index from Gompers et al. (2003). Source: Institutional Shareholder Services.
WW-index	Financial constraints index constructed by Whited and Wu (2006). WW-index is computed as - 0.091 CF/AT-0.062DIV_POS + 0.021 $TLTD/AT$ -0.044 $LNTA$ + 0.102 ISG - 0.035SG where CF/AT is the ratio of cash ow to total asset, $TLTD$ is the ratio of the long-term debt to total assets, $LNTA$ is natural logarithm of total assets, DIV_POS is an indicator that takes the value of 1 if the firm pays cash dividends, ISG is the firm's three-digit SIC-based industry sales growth, SG is firm's sales growth. Source: Compustat.
HP-index	Financial constraints index bases on firm size and age constructed by Hadlock and Pierce (2010), which is -0.737 $Firmsize$+0.043 $Firmsize^2$-0.040 Age where $Firmsize$ is equal to the natural logarithm of GDP-deflated total asset, Age is the number of years since the firm enter Compustat. Source: Compustat.

TABLE 1: Summary statistics

Panel A: Sample distributions by the number of children

Children	Freq.	Percent
0	145	3.68
1	272	6.91
2	1,543	39.17
3	1,180	29.96
4	493	12.52
5	143	3.63
6	73	1.85
7	14	0.36
8	51	1.29
10	25	0.63

Panel B: Descriptive statistics

Variable	Obs.	Mean	Std.Dev.	p(25)	p(50)	p(75)
CAPEX_AT	3089	0.045	0.047	0.014	0.031	0.060
CAPEX10	3089	0.097	0.297	0.000	0.000	0.000
MA_Deal	3089	0.343	0.475	0.000	0.000	1.000
Children	3089	2.717	1.473	2.000	2.000	3.000
MTB	3089	2.133	2.501	1.193	1.614	2.390
CashFlow	3089	0.094	0.080	0.054	0.092	0.133
Log_AT	3089	9.635	1.567	8.538	9.584	10.617
ROA	3089	0.137	0.090	0.085	0.130	0.181
SalesGrowth	3089	0.087	0.252	-0.006	0.060	0.142
ExeAge	3089	56.300	7.427	52.000	56.000	60.000
FemaleCEO	3089	0.049	0.215	0.000	0.000	0.000
Tenure	3089	7.655	8.131	3.000	6.000	10.000
StockOwnership	3089	1.669	5.718	0.000	0.122	0.723
OverConfidence	3089	0.606	0.489	0.000	1.000	1.000
Neg	3089	0.266	0.442	0.000	0.000	1.000
QPT	2788	1.648	2.515	0.631	1.029	1.714
RET_IND	1548	0.000	0.433	-0.147	-0.025	0.085
RET_MKT	1548	0.092	0.523	-0.143	0.020	0.215
Leverage	1548	0.163	0.124	0.067	0.143	0.233
NetFinancing	1548	-0.003	0.237	-0.045	-0.015	0.012
ΔR&D	1548	0.000	0.015	0.000	0.000	0.000
ΔEarnings	1548	0.250	10.311	-0.009	0.006	0.023
ΔDividends	1548	0.001	0.016	0.000	0.000	0.002
ΔInterests	1548	0.002	0.068	-0.001	0.000	0.002
ΔNetAssets	1548	0.075	0.996	-0.009	0.028	0.080
CAR(-3,+3)(in %)	565	-0.159	5.719	-2.753	-0.271	2.152
CAR(-5,+5)(in %)	565	-0.137	6.438	-3.204	-0.227	2.610
Related	565	0.204	0.403	0.000	0.000	0.000
StockPurchase	565	0.018	0.132	0.000	0.000	0.000
PublicTarget	565	0.712	0.453	0.000	1.000	1.000
Log_DealValue	565	5.908	1.834	4.804	5.889	7.004
STD_EPS	3089	0.475	0.354	0.200	0.378	0.657
STD_SALE	3089	1.953	2.179	0.595	1.179	2.471
G-index	1704	9.008	2.448	7.000	9.000	11.000
CEO duality	3089	0.565	0.496	0.000	1.000	1.000
WW-index	3075	-0.462	0.095	-0.524	-0.465	-0.413
HP-index	3089	-4.484	0.787	-5.218	-4.424	-3.788

Panel A presents the sample distribution by the number of CEO children for our sample of 3,089 firm-year observations for S&P 500 companies from 1998 to 2018. Panel B shows the mean, standard deviation, 25th percentile, median, and 75th percentile of variables used in the paper. Definitions of the variables are provided in the Appendix. $CAR(-3,+3)$ and $CAR(-5,+5)$ are expressed in percentage terms.

TABLE 2: CEO children and corporate investment

	(1) CAPEX_AT	(2) CAPEX10	(3) MA_Deal
Children	0.002	0.144	0.060
	(0.00)	(0.02)	(0.02)
dydx(Children)		0.011	0.0166
		(0.02)	(0.02)
MTB	0.001	0.018	0.016
	(0.00)	(0.12)	(0.24)
CashFlow	0.030	1.533	0.971
	(0.05)	(0.13)	(0.17)
Log_AT	-0.002	-0.166	0.197
	(0.00)	(0.03)	(0.00)
ROA	0.022	1.364	0.233
	(0.34)	(0.24)	(0.74)
SalesGrowth	-0.002	-0.279	0.136
	(0.65)	(0.10)	(0.26)
ExeAge	-0.000	-0.078	0.064
	(0.67)	(0.40)	(0.25)
$ExeAge^2$	-0.000	0.000	-0.001
	(0.81)	(0.63)	(0.19)
FemaleCEO	0.004	0.470	-0.239
	(0.04)	(0.31)	(0.28)
Tenure	0.000	0.008	0.012
	(0.59)	(0.55)	(0.09)
StockOwnership	0.000	0.023	-0.006
	(0.14)	(0.03)	(0.33)
OverConfidence	0.001	0.148	-0.032
	(0.54)	(0.52)	(0.75)
Constant	0.038	-1.782	-4.017
	(0.02)	(0.45)	(0.01)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Obs.	3089	3089	3089
R-squared	0.630	0.560	0.222
Method	OLS	Probit	Probit

The two-tailed p-values based on Driscoll and Kraay (1998) standard errors (CEO-firm level clustering standard errors) for OLS (probit) regressions are shown in the parentheses. Industry FE refers to 3-digit SIC code industry dummies.

TABLE 3: CEO children and overinvestment

	(1) OverInvest	(2) D_OverInvest		(3) CAPEX_AT Market-to-book (MTB)	(4) CAPEX_AT Peters and Taylor's q (QPT)
Children	0.002	0.085	Children×MTB	-0.0003	
	(0.00)	(0.02)		(0.32)	
Cash_AT	-0.031	-0.907	Children×QPT		-0.0004
	(0.00)	(0.06)			(0.00)
			MTB	0.0016	
				(0.03)	
			QPT		0.0015
					(0.00)
Tangibility	0.046	2.272	Children	0.002	0.002
	(0.00)	(0.00)		(0.00)	(0.00)
Controls	Yes	Yes	Controls	Yes	Yes
Year FE	Yes	Yes	Year FE	Yes	Yes
Industry FE	Yes	Yes	Industry FE	Yes	Yes
Obs.	2824	2824	Obs.	3089	3076
R-squared	0.351	0.290	R-squared	0.650	0.631
Method	OLS	Probit	Method	OLS	OLS

OverInvest is measured as deviation from the expected investment using the model based on Chen et al. (2011) that predicts investment as a function of growth opportunities. *D_OverInvest* is a binary variable equal to one if *OverInvest* is positive, and zero otherwise. The two-tailed p-values based on Driscoll and Kraay (1998) standard errors for OLS and clustered (by CEO-firm level) standard errors for probit regressions are shown in the parentheses. Industry FE refers to 3-digit SIC code industry dummies.

TABLE 4: CEO children and the market valuation of investment

	(1) RET_IND	(2) RET_MKT		(3) CAR(-3,+3)	(4) CAR(-5,+5)
$\frac{\Delta Capex_{it}}{MktCap_{i,t-1}}$ × Children	-0.390	-0.422	Children	-0.433	-0.570
	(0.01)	(0.01)		(0.00)	(0.02)
$\frac{\Delta Capex_{it}}{MktCap_{i,t-1}}$	0.399	0.347	Related	0.051	-0.195
	(0.12)	(0.30)		(0.94)	(0.79)
Children	0.005	0.007	StockPurchase	-0.156	-0.381
	(0.54)	(0.60)		(0.96)	(0.89)
Leverage	-0.863	-1.289	PublicTarget	-0.333	-0.596
	(0.00)	(0.00)		(0.81)	(0.57)
NetFinancing	0.123	0.147	Log_DealValue	-0.499	-0.312
	(0.38)	(0.35)		(0.03)	(0.24)
ΔR&D	-0.911	-2.455	Log_AT	-0.094	-0.174
	(0.06)	(0.00)		(0.76)	(0.56)
ΔEarnings	0.009	0.005	MTB	-0.017	-0.068
	(0.01)	(0.18)		(0.92)	(0.60)
ΔDividends	0.644	0.638	CashFlow	15.878	0.821
	(0.01)	(0.14)		(0.01)	(0.93)
ΔInterests	-2.915	-3.115	ROA	-1.725	9.115
	(0.00)	(0.00)		(0.82)	(0.34)
ΔNetAssets	0.076	0.128	SalesGrowth	-1.803	-1.584
	(0.03)	(0.00)		(0.06)	(0.32)
			ExeAge	-0.820	-0.564
				(0.09)	(0.14)
			$ExeAge^2$	0.008	0.005
				(0.05)	(0.09)
			FemaleCEO	-3.511	-2.803
				(0.01)	(0.12)
			Tenure	-0.068	-0.045
				(0.09)	(0.31)
			StockOwnership	-0.038	-0.020
				(0.46)	(0.72)
			OverConfidence	0.454	-0.208
				(0.51)	(0.68)
Year FE	Yes	Yes	Year FE	Yes	Yes
Industry FE	Yes	Yes	Industry FE	Yes	Yes
Obs.	1539	1539	Obs.	565	565
R-squared	0.133	0.206	R-squared	0.288	0.295

$\Delta CAPEX$ is the change in a firm's capital expenditure from $t-1$ to t scaled by the market value of equity at $t-1$. RET_IND is the industry-adjusted buy-and-hold return. RET_MKT is the market-adjusted buy-and-hold return. $CAR(-3,+3)$ and $CAR(-5,+5)$ are the acquirer's cumulative abnormal return over the window of (t-3, t+3) and (t-5, t+5), respectively. The two-tailed p-values based on Driscoll and Kraay (1998) standard errors are shown in the parentheses. Industry FE refers to 3-digit SIC code industry dummies.

TABLE 5: CEO children and earnings volatility

	(1)	(2)
	SD_EPS	SD_SALE
Children	-0.010	-0.057
	(0.03)	(0.09)
MTB	0.000	-0.008
	(0.99)	(0.45)
CashFlow	-0.337	-1.560
	(0.39)	(0.31)
Log_AT	0.015	0.227
	(0.00)	(0.00)
ROA	-0.213	1.079
	(0.48)	(0.45)
SalesGrowth	-0.029	-0.016
	(0.25)	(0.94)
ExeAge	-0.024	-0.191
	(0.01)	(0.07)
$ExeAge^2$	0.000	0.001
	(0.01)	(0.10)
FemaleCEO	-0.051	-0.367
	(0.07)	(0.00)
Tenure	0.000	0.004
	(0.92)	(0.47)
StockOwnership	-0.001	0.017
	(0.22)	(0.01)
OverConfidence	0.003	0.260
	(0.87)	(0.04)
Year FE	2.011	8.500
Industry FE	(0.00)	(0.00)
Obs.	3089	3089
R-squared	0.481	0.397

SD_EPS (*SD_SALE*) is the standard deviation of quarterly earnings (sales) per share over the past five years. The two-tailed *p*-values based on Driscoll and Kraay (1998) standard errors are shown in the parentheses. Industry FE refers to 3-digit SIC code industry dummies.

TABLE 6: Effect of corporate governance and financing constraints

Panel A. Corporate governance						
	CAPEX_AT Low CG	CAPEX_AT High CG	CAPEX10 Low CG	CAPEX10 High CG	MA_Deal Low CG	MA_Deal High CG
Children	0.006	-0.000	0.281	-0.025	0.233	0.042
	(0.01)	(0.78)	(0.13)	(0.89)	(0.02)	(0.43)
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	748	956	748	956	748	956
R-squared	0.711	0.692	0.727	0.591	0.338	0.315
	CAPEX_AT Duality=1	CAPEX_AT Duality=0	CAPEX10 Duality=1	CAPEX10 Duality=0	MA_Deal Duality=1	MA_Deal Duality=0
Children	0.003	-0.000	0.204	0.010	0.066	0.003
	(0.00)	(0.84)	(0.00)	(0.92)	(0.05)	(0.95)
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1746	1343	1746	1343	1746	1343
R-squared	0.697	0.643	0.633	0.619	0.273	0.258
Panel B. Financial constraints						
	CAPEX_AT Low WW	CAPEX_AT High WW	CAPEX10 Low WW	CAPEX10 High WW	MA_Deal Low WW	MA_Deal High WW
Children	0.002	0.000	0.109	0.047	0.060	0.036
	(0.01)	(0.97)	(0.18)	(0.60)	(0.09)	(0.39)
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1543	1532	1543	1532	1543	1532
R-squared	0.695	0.662	0.681	0.578	0.247	0.291
	CAPEX_AT Low HP	CAPEX_AT High HP	CAPEX10 Low HP	CAPEX10 High HP	MA_Deal Low HP	MA_Deal High HP
Children	0.002	-0.000	0.144	0.113	0.082	0.006
	(0.00)	(0.98)	(0.17)	(0.28)	(0.05)	(0.89)
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1548	1541	1548	1541	1548	1541
R-squared	0.714	0.700	0.606	0.626	0.270	0.254

Subsamples are classified based on: 1) whether a firm's G-index is above or below the median value for our sample firms as low and high corporate governance, and whether CEO also holds the title of chairman in Panel A, and 2) whether a firm's WW-index (HP-index) is below (above) the median value for Compustat firms as financially unconstrained (constrained) firms in Panel B. The two-tailed p-values based on Driscoll and Kraay (1998) standard errors (standard errors clustered by CEO-firm level) for OLS (probit) regressions are shown in the parentheses. Industry-Year FE indicates the inclusion of year fixed effects and 3-digit SIC industry fixed effects.

FIGURE 1
Timeline of decisions and key events

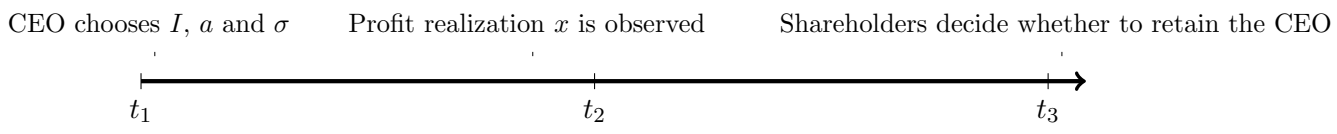
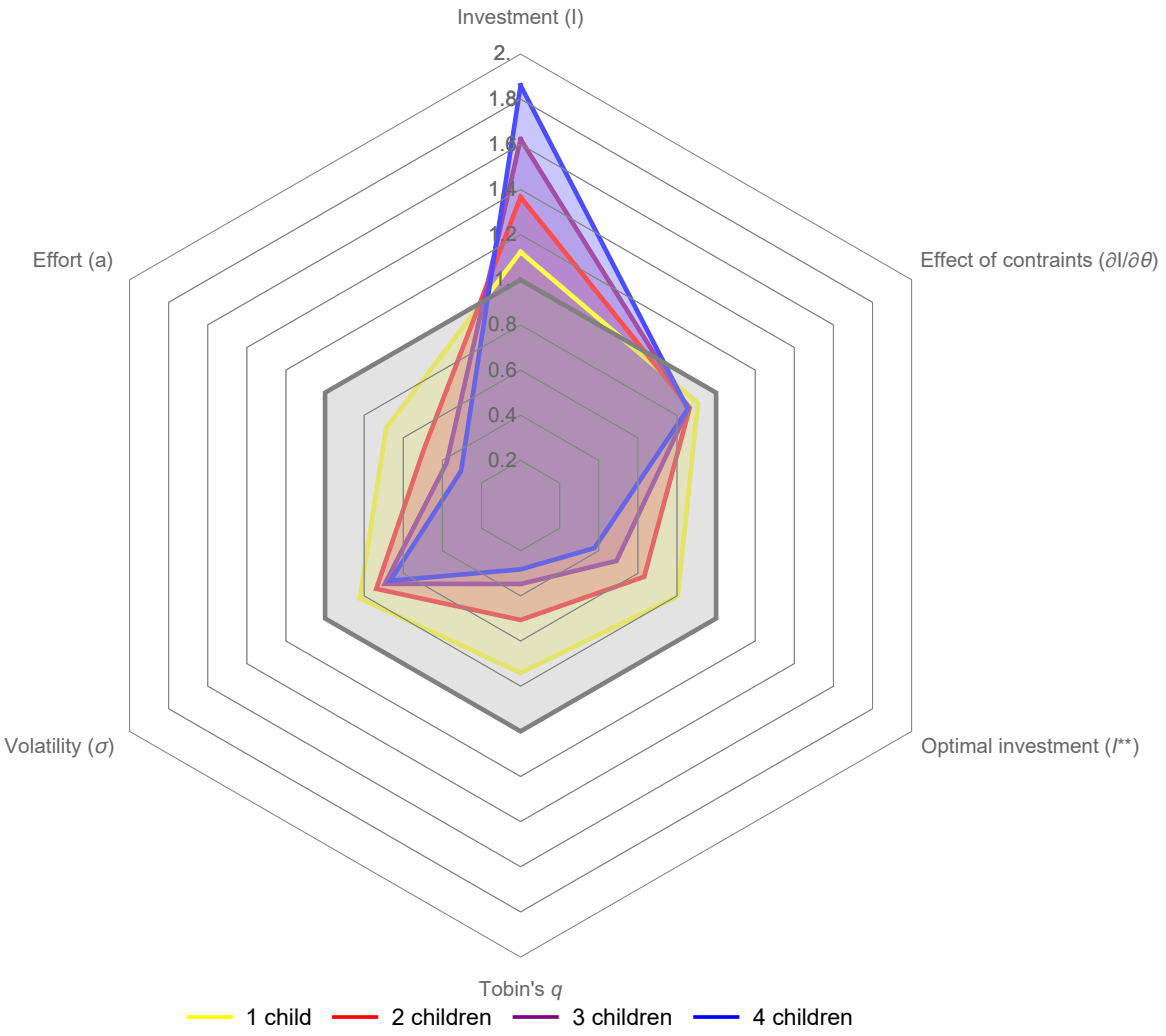


FIGURE 2
Effect of the number of children n on managerial decisions and key investment parameters



Managerial choices of investment (I), effort (a), volatility (σ), as well as Tobin's q, shareholders optimal investment (I^{**}), and the sensitivity of investment to internal and external constraints ($\partial I/\partial\theta$) as functions of the number of children (n) relative to the case of $n = 0$ (as $\partial I/\partial\theta$ is negative, the inverse ratio is plotted), for the following set of model parameter values: $\kappa = 0.05, w = 0.1, b = 5 * 10^{-4}, c = 0.75, m = 0.75, k = 0.001, \theta = 1, \upsilon = 1$, and $\delta = 1.5$.

Online Appendix

Family to Firm Expansion: How Does the CEO Children Number Affect Corporate Investment?

Shushu Liao* Nhut H. Nguyen† Grzegorz Pawlina‡

Abstract

This Online Appendix contains results and technical details that are referred to but not reported in the main manuscript. Section OA1 presents results regarding the use of the instrumental variables approach to handle potential endogeneity issues, whereas Section OA2 discusses evidence based on CEO turnover events. Section OA3 shows additional robustness checks. Definitions and summary statistics of additional variables introduced in the Online Appendix are provided in Table OA1.

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1 Instrumental variables approach

The variation in the CEO children number is likely influenced by the state-level supportiveness of raising a young child. Hence, the quality of the health care system and the costs of raising a child should have a material impact on the individual's propensity to have children. To capture those effects, we use information from the ranking 'Best & Worst States to Have a Baby' provided by $WalletHub$.[1] To alleviate concerns over the possibility that the rankings are measured with an error or subject to changes if the survey is performed at different times, we sort the states into quintiles based on the cost rank, rank of the health care system, baby friendliness, and family friendliness (with rank 5 corresponding to the top quintile and highest quality of health system, baby friendliness, family friendliness or lowest cost and 1 – to the bottom quintile).[2] It is worth pointing out that the state-level ranks are not necessarily related to other, more general state characteristics such as GDP or size (both poor and rich states as well as both large and small ones are present among relatively highly ranked states). The instrumental variables are the quintiles of the above-mentioned ranks for the state in which the company headquarters are located.

Table OA2 shows that baby friendliness and the cost rank of having a young child can explain the number of CEO children, with CEOs working for a company headquartered in the states with lower costs of raising a child and higher baby friendliness having more children.[3] The coefficient of the instrumented variable $Children$ is positive and statistically significant for all three investment

[1]The ranking information can be found at https://wallethub.com/edu/best-and-worst-states-to-have-a-baby/6513/. For example, parents in Louisiana and North Dakota pay the least, and those in California and Wyoming pay the most (with the latter ranked the worst and $CostRank$ having the lowest value).

[2]Even though the cost might not be a major concern for a wealth individual like CEO, Jennings and Barber (2013) shows that an individual's birth rate is affected by neighbors' family size preferences, which are strongly related to the cost issues.

[3]Note that it might be counter-intuitive that the coefficient on family friendliness is negative and significant. Nonetheless, family literature (e.g., Gauthier, 2007) shows that higher fertility levels can emerge in some countries despite lower levels of state support for families. Hence, the negative association between family friendliness and the rate of having children can be due to some omitted factors underlying the relationship. More importantly, Shockley and Allen (2007) argue that family-supportive policies such flexible work arrangement relate highly to work interference with family (WIF), which occurs when work interferes with family life.

variables, with a p-value of 0.00, 0.00, and 0.05, and for columns (2), (3) and (4), respectively. The F-test for the overall significance of instruments in the first stage is 17.26, implying that the instruments satisfy the relevance condition. In column (2), we report a positive and significant coefficient estimate for *Children*. However, the Sargan test of overidentifying restrictions for $CAPEX\_AT$ rejects the null hypothesis of the instruments being orthogonal in this case. The rejection of the null hypothesis of no endogeneity based on the Wald Chi-squared test for $CAPEX10$ (p-value = 0.00) means that the instrumental-variables probit model is a more suitable approach. We find that the relation between the CEO children number and the propensity to undertake large investment projects continues to be positive and significant after we instrument *Children* with the baby friendliness ranks. Finally, the p-value of the Wald Chi-squared test (p-value = 0.18) in column (4) does not allow for rejecting the hypothesis of no endogeneity for MA_Deal, so the positive association between the CEO children number and corporate M&A activity should be inferred from the standard probit model shown in the Table 2 in the main text.

In what follows, we first present the motivation behind and the results of using within-firm CEO transitions to mitigate the impact of unobserved firm-specific factors, followed by the discussion of the effects on the number of CEO children on other key aspects of firm activities as well as the results for samples from which single and, subsequently, female CEOs are excluded.

2 Evidence based on CEO turnover

Our explanation of observed relation between the CEO children number and investment is based on the presumption that CEOs with more children imprint their personal preferences resulting from the family structure on the firm they manage (imprinting effect). However, our main results may not entirely immune to the potential sorting of CEOs into firms with more demand for

aggressive investment and merger strategies. The alternative, endogenous matching explanation is that firms that are about to attempt large investment projects choose to hire more expansion-oriented CEOs (i.e., those with more children) to exploit their ambition and match the CEOs' personal preferences with the firm's strategic vision (sorting effect). In addition, unobservable firm-specific factors that are important to both CEOs and the firms' investment strategies could also bias our original findings. To rule out the possibility that our results are driven by time-invariant firm characteristics and distinguish between the CEO sorting and imprinting effects, we examine whether the change of the CEO children number following CEO turnover alters the investment policy of a firm.

We first identify all instances of CEO turnover in the sample (there are 91 in total) after limiting the observations to those with available information about the CEO children number. We define $\Delta Children$ as the number of children of the incoming CEO minus the number of children of the outgoing CEO. $\Delta CAPEX\_AT$ is the difference between average $CAPEX\_AT$ over the three years with the new CEO and that with the outgoing CEO. $D(CAPEX10)$ ($D(MA\_Deal)$) equals one if the firm have large $CAPEX\_AT$ (M&A deals) in the three years following the appointment of a new CEO but no large $CAPEX\_AT$ (M&A deals) three years before the CEO turnover, and zero otherwise (large $CAPEX\_AT$ corresponds to $CAPEX10$ being equal to 1). Results of cross-sectional regressions (OLS regression for column (1) and probit regression for columns (2) and (3)) regarding the effects of the change of the CEO children number on the change of investment are shown in Table OA3. Coefficients of $\Delta Children$ are positive and significant for all definitions of investment changes. This suggests that the replacement of a CEO with fewer children with a successor with more offspring results in an increase in $CAPEX\_AT$ as well as in the likelihood of engaging in large capital expenditures and M&A deals.[4]

[4]As shown in column (1), replacing a CEO with n children with another CEO with $n+1$ children increase

3 Additional robustness checks

3.1 Exclusion of female and female CEOs

Roussanov and Savor (2014) demonstrate that single CEOs are more aggressive and risk-tolerant than their married counterparts and tend to implement more risky corporate strategies, exemplified – among others – by their investments. To alleviate the concerns that our main results are driven by the marital status of a CEO, we remove firm-years corresponding to single CEOs and redo our baseline regression analysis. Moreover, to the extent that parenthood decreases the labor participation rates of one spouse and encourage the other spouse to increase earnings by growing firm size, we expect that such household income commitment is relatively stronger for male CEOs. We therefore exclude firm-years corresponding to female CEOs and, again, redo the estimation. The results after removing single CEOs and, subsequently, female CEOs are presented in Table OA4. The coefficients of *Children* are positive and significant in all specifications, suggesting that our main results are robust to the exclusion of single and female CEOs.

3.2 Alternative measures of corporate expansion and CEO children

We tend to examine the robustness of our main findings using the acquisition expenditure item obtained from Compustat as an alternative measure of corporate expansion. Following Roussanov and Savor (2014), AQC_AT is a firm's acquisition expenditure scaled by its total assets. Results on AQC_AT are shown in Panel A of Table OA5. The effect of *Children* on AQC_AT is positive and significant at the 1% level (p-value < 0.01), showing that firms led by CEOs with more children invest more in acquisitions. One additional CEO children leads to an increase of 0.002 in the

$CAPEX\_AT$ by 0.001, which amounts to 2.3% of the unconditional mean of $CAPEX\_AT$.

acquisitions-to-assets ratio, which is 10% over its unconditional mean of 0.02. Furthermore, to eliminate a possible concern that the significant results are driven by CEOs with extremely large or small number of children, instead of using the continuous variable, we create a dummy variable, $Dummy(Children > 3)$, which is equal to one if a CEO has more than three children, and zero if the CEO has fewer than three children. We report the estimation results in Panel B of Table OA5. Consistent with the previous results, the coefficient of $Dummy(Children > 3)$ is positive and statistically significant across the three investment measures, indicating that our result is not driven by observations with more extreme value of $Children$.

TABLE OA1: Variable definitions and summary statistics

Panel A. Variables definitions

CostRank	Rank of costs to have a baby for each state. Ranks are sorted into quintile (with 5 being the lowest cost and 1 – the highest cost of having a baby). Source: *WalletHub* Survey
HealthCareRank	Rank of the health care system for each state. Ranks are sorted into quintile (with rank 5 corresponding to the highest quintile for the quality of health care system and 1 – to the lowest one). Source: *WalletHub* Survey
BabyFriendlinessRank	Rank of baby friendliness for each state. Ranks are sorted into quintile (with rank 5 corresponding to the highest quintile for the degree of baby friendliness and 1 – to the lowest one). Source: *WalletHub* Survey
FamilyFriendlinessRank	Rank of family friendliness for each state. Ranks are sorted into quintile (with rank 5 corresponding to the highest quintile for the degree of family friendliness and 1 – to the lowest one). Source: *WalletHub* Survey
AQC_AT	Acquisitions expenditures (aqc) divided by total assets (at). Source: Compustat.

Panel B. Descriptive statistics

Variable	Obs.	Mean	Std.Dev.	p(25)	p(50)	p(75)
CostRank	3713	2.953	1.392	2.000	3.000	4.000
HealthCareRank	3713	2.770	1.452	1.000	3.000	4.000
BabyFriendlinessRank	3713	2.876	1.437	1.000	3.000	4.000
FamilyFriendlinessRank	3695	2.784	1.438	2.000	2.000	4.000
AQC_AT	3541	0.021	0.052	0.000	0.001	0.016

Panel A shows the definitions of additional variables that are introduced in the Online Appendix. Panel B presents the mean, standard deviation, 25th percentile, median, and 75th percentile of each variable.

TABLE OA2: Instrumental variables approach

	(1)	(2)	(3)	(4)
	Children	CAPEX_AT	CAPEX10	MA_Deal
	First-stage		Second-stage	
Children		0.007	0.442	0.199
		(0.00)	(0.00)	(0.05)
CostRank	0.085			
	(0.01)			
HealthCareRank	-0.008			
	(0.80)			
BabyFriendlinessRank	0.126			
	(0.00)			
FamilyFriendlinessRank	-0.257			
	(0.00)			
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	2909	2909	2909	2909
F-test of instruments	17.26			
Sargan/Wald χ^2 test		16.38	8.83	1.84
p-value		0.00	0.00	0.18

Results of instrumental variable (IV) estimation analysis for the relation between the number of CEO children and corporate expansion. Industry FE refers to 3-digit SIC code industry dummies. Results of the F-test of overall significance for the instruments in the first stage, the Wald Chi-squared test of exogeneity of the instruments and the Sargan test of overidentifying restrictions are also included. The two-tailed p-values based on Driscoll and Kraay (1998) standard errors for OLS and two-step standard errors for probit regressions are shown in the parentheses.

TABLE OA3: Evidence based on CEO turnover

	(1) ΔCAPEX_AT	(2) D(CAPEX10)	(3) D(MA_Deal)
ΔChildren	0.001	0.144	0.216
	(0.02)	(0.09)	(0.02)
ΔMTB	-0.002	-0.105	0.247
	(0.44)	(0.77)	(0.58)
ΔCashFlow	0.034	-13.900	43.624
	(0.31)	(0.00)	(0.06)
ΔLog_AT	0.004	1.688	0.651
	(0.33)	(0.05)	(0.26)
ΔROA	0.168	4.515	-23.755
	(0.00)	(0.61)	(0.18)
ΔSalesGrowth	-0.022	-1.141	-8.692
	(0.20)	(0.30)	(0.02)
ΔExeAge	0.003	0.488	0.354
	(0.12)	(0.01)	(0.33)
ΔExeAge^2	-0.000	-0.004	-0.003
	(0.14)	(0.01)	(0.36)
ΔFemaleCEO	0.005	-0.546	-0.601
	(0.12)	(0.18)	(0.16)
ΔTenure	-0.001	0.089	-0.033
	(0.00)	(0.01)	(0.10)
ΔStockOwnership	0.000	0.034	0.034
	(0.29)	(0.08)	(0.14)
ΔOverConfidence	-0.000	-0.214	-0.197
	(0.97)	(0.54)	(0.62)
Constant	-0.004	-1.430	-3.080
	(0.08)	(0.00)	(0.00)
Obs.	91	91	91
R-squared	0.327	0.360	0.363

Results of the cross-sectional regression for 91 CEO transition events. $\Delta CAPEX\_AT$ is the difference in three-year average $CAPEX\_AT$ between the incumbent and the successor CEO. $D(CAPEX10)$ ($D(MA\_Deal)$) equals 1 if the firm have any large $CAPEX\_AT$ (M&A) in the three years following the appointment of a new CEO but no large $CAPEX\_AT$ (M&A) three years before the CEO turnover. ΔChildren indicates the difference of $Children$ between the new CEO and incumbent CEO. All regressions control for firm and year fixed effects and other control variables are defined analogously. $CEO\_turnover$ is a dummy variable taking the value of one in the three-year period after a CEO turnover, and zero for three-year period prior to the turnover. The two-tailed p-values based on heteroscedasticity-consistent standard errors are shown in the parentheses.

TABLE OA4: Baseline regressions excluding single or female CEOs

	Excluding single CEOs		
	CAPEX_AT	CAPEX10	MA_Deal
Children	0.002	0.140	0.054
	(0.00)	(0.02)	(0.05)
Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	3034	3034	3034
R-squared	0.650	0.560	0.223
	Excluding female CEOs		
	CAPEX_AT	CAPEX10	MA_Deal
Children	0.002	0.152	0.065
	(0.00)	(0.01)	(0.01)
Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	2939	2939	2939
R-squared	0.648	0.558	0.223

The two-tailed p-values based on Driscoll and Kraay (1998) standard errors (CEO-firm level clustering standard errors) for OLS (probit) regressions are shown in the parentheses. Industry FE refers to 3-digit SIC code industry dummies.

TABLE OA5: Acquisition expenses and dummy variables on *Children*

	AQC_AT		
Children	0.002		
	(0.01)		
Controls	Yes		
Industry FE	Yes		
Year FE	Yes		
Obs.	2798		
R-squared	0.160		
	CAPEX_AT	CAPEX10	MA_Deal
Dummy(Children>3)	0.004	0.611	0.202
	(0.08)	(0.01)	(0.08)
Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	3089	3089	3089
R-squared	0.649	0.560	0.223

The two-tailed p-values based on Driscoll and Kraay (1998) standard errors (CEO-firm level clustering standard errors) for OLS (probit) regressions are shown in the parentheses. Industry FE refers to 3-digit SIC code industry dummies.

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