CEO Birth Order and Risk-Taking: Evidence from the Investment Factor in Family Firms[1]

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[1]Preliminary results - Working Paper

Outline

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Introduction

Question: Does a CEO's birth order impacts the way their firm takes risk?

- Capital-market perspective (Fama–French 5-factor model)
- Capture firms' investment postures as perceived by investors

- **Main Findings:**
  - Firms led by first-born CEOs adopt more conservative investment postures
  - Conservatism reinforced in more mature firms and with female siblings

Research Relevance: Why Birth Order Matters for CEOs

- **Early-life:** Early-life experiences shape executive behavior and decision-making processes (Chin et al., 2013; Crossland et al., 2014; Finkelstein et al., 2009; O'Sullivan et al., 2021)
- **Evolutionary psychology:**
  - Birth order is defined as a significant determinant of individual behaviors (Otterbring et al., 2023; Steelman, 1985; Han and Greene, 2016) .
  - Personality characteristics associated with birth order arise from adaptive strategies developed during early childhood (Sulloway, 1996)
  - Later-borns score significantly lower in fearfulness and anxiety, while scoring higher in openness to experience Sulloway (1995); Eckstein et al. (2010)
- **Leadership characteristics**: CEO traits (age, gender, tenure) systematically affect corporate risk-taking (e.g., Serfling 2013; Yim 2013; Huang and Kisgen 2013; Sørensen and Stuart 2000)

Research gap: Birth order and risk-taking

- **Management evidence:** Firstborn CEOs are more conservative (Campbell et al., 2019), Academy of Management.
  - $Risk\text{-}taking_{t+1} = \log(\text{CapEx} + \text{R\&D} + \text{Acquisitions})$
- **Finance evidence:**
  - Gilliam and Chatterjee (2011), find that firstborns are more conservative, and therefore less tolerant of risk, than later-borns [2]
    - Stock ownership: Later-born more likely to allocate a greater proportion of assets to stocks
  - Later-born mutual fund managers take more risk and perform worse (lower risk-adjusted returns) (Agarwal et al., 2024), Journal of Corporate Finance.
    - Risk-taking = higher portfolio volatility, turnover, tracking error, and idiosyncratic risk

Novelty of our paper

- Link from executive birth order to a capital-market perspective

[2] as defined by Grable Lytton Risk Tolerance Scale (GL-RTS). The Grable–Lytton Risk Tolerance Scale (GL-RTS) is a 13-item psychometric questionnaire widely used in finance and psychology to measure financial risk tolerance. It captures attitudes toward investment, uncertainty, and decision-making, with higher scores indicating greater willingness to take risk.

Birth Order and Other Organizational Outcomes

- CEO birth order can influence innovation initiatives (Zheng et al., 2021) , R&D investments (Li et al., 2021) and firm performance (Schenkel et al., 2016)
- Later-borns display higher risk-taking in domains as diverse as military service (Jobe et al., 1983) , sports (Sulloway and Zweigenhaft, 2010) , substance use and sexual activity (Argys et al., 2006) and outdoor challenges (Wang et al., 2009)

Family Firms and Conservatism

- **Family legacy:** Family CEOs, who are typically seen as the natural heirs of the family legacy, face strong pressures to preserve rather than endanger the continuity of the family enterprise. Custodio and Siegel (2020)
- **Firm age effect:** Older, well-established family firms tend to be more embedded in their communities, have stronger traditions (e.g., (Blombäck and Brunninge, 2013; Byrom and Lehman, 2009; Zellweger and Sieger, 2012) and may reinforce conservative strategies.
- **Sibling gender:** Growing up with sisters can instill more empathy and caution in a first-born. (Okudaira et al., 2015; Zheng et al., 2022; Sulloway, 1996; Okudaira et al., 2015)

Our expectation: Firms with first-born CEOs will steer toward conservative investments, especially in older firms and when female siblings are present.

Hypotheses

H1: *Firms with first-born CEOs adopt more conservative investment strategies (higher CMA beta).*

H2: *The conservative impact of first-born status is stronger in older firms.*

- **Firm age:** Deep-rooted firms value stability (Acemoglu et al., 2007) .

H3: *The conservative impact of first-born status is stronger when the CEO has female siblings.*

- **Female siblings:** Sisters' influence encourages caution (Okudaira et al., 2015; Zheng et al., 2022) .

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Data and Sample

- **Sample:** 62 large, publicly listed family firms (2010-2024 worldwide)[3].
- **Family criteria:** Firms must (i) have existed for at least 21 years for generational transition, and (ii) at least 30% of the voting rights for publicly listed firms, owned by the members of one family or group of families.
- **Family Variables:** NRG family dataset for family variables (CEO age, CEO change, firm age, board composition). The CEO's birth order and siblings' information are hand-collected.
- **Financial data:** Monthly stock returns and fundamentals from LSEG (Refinitiv).
- Fama–French 5-factor model (Developed markets)

Family firm samples allow us to avoid endogeneity issues

[3] Our empirical analysis builds on the dataset of the largest family-controlled firms worldwide, as compiled by FamilyCapital (2020) with the support of PWC (and also used in Rovelli et al. (2024), Strategic Entrepreneurship Journal)

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Step 1: Estimating factor loadings

We apply the Fama–French five-factor model (Fama and French, 2015) for each firm-CEO:

$$R_{i,c,t} - R_{f,t} = \alpha_i + \beta_{MKT,i,c}\, MKT_t + \beta_{\text{SMB,i,c}}\, SMB_t + \beta_{\text{HML,i,c}}\, HML_t + \beta_{\text{RMW,i,c}}\, RMW_t + \beta_{\text{CMA,i,c}}\, CMA_t + \varepsilon_{it} \quad (1)$$

- β_{CMA}: Loading on the *Conservative Minus Aggressive* factor — proxy for firms' investment style; interpreted here as our measure of strategic risk-taking.
- β_{MKT}: Loading on the excess market return — captures exposure to aggregate market risk.
- β_{SMB}: Loading on the *Small Minus Big* factor — captures firm size effects (small vs. large firms).
- β_{HML}: Loading on the *High Minus Low* factor — captures value vs. growth orientation (book-to-market).
- β_{RMW}: Loading on the *Robust Minus Weak* factor — captures profitability effects.
- α_i: Risk-adjusted abnormal returns (Jensen, 1968)
- i is the firm, c is the CEO

Step 2: Linking factor loadings to CEO birth order

Procedure:

1. Estimate betas and alphas per CEO–firm spell.
2. Regress on birth order, controls, and moderators:

$$\begin{aligned}\beta_{\mathrm{CMA},i,c} = {} & \gamma_0 + \gamma_1\,\mathrm{FirstBorn}_{i,c} + \gamma_2\,\ln \mathrm{FirmAge}_{i,c,t} + \gamma_3\,\mathrm{FemaleSibling}_{i,c} \\ & + \gamma_4\left(\mathrm{FirstBorn}_{i,c} \times \ln \mathrm{FirmAge}_{i,c,t}\right) + \gamma_5\left(\mathrm{FirstBorn}_{i,c} \times \mathrm{FemaleSibling}_{i,c}\right) \\ & + \mathbf{X}'_{i,c,t}\boldsymbol{\gamma} + \varepsilon_{i,c,t},\end{aligned} \tag{2}$$

- $\beta_{CMA,i,c}$ is the strategic risk-taking proxy for firm i under CEO c
- First-born$_i$ captures the CEO's birth-order status
- t stands for the year
- Explanatory variables $\mathbf{X}_i$ may vary annually and include the full set of CEO- and firm-level controls

Statistics

	mean	sd	min	max
β_CMA, i, c	0.27	1.46	-3.05	7.95
β_RMW, i, c	0.37	0.79	-2.10	2.40
β_MRKT, i, c	0.93	0.46	0.12	2.12
β_SMB, i, c	0.40	0.90	-1.35	3.66
β_HML, i, c	0.13	0.83	-2.92	3.27
α_i, c	0.00	0.01	-0.02	0.02
CEO Firstborn	0.41	0.49	0.00	1.00
Firm Age	4.07	0.62	1.39	5.55
Female Sibling	0.68	0.52	0.00	2.00
Family CEO	0.93	0.26	0.00	1.00
CEO Change	0.02	0.15	0.00	1.00
Family Generation Management	1.51	1.34	0.00	5.00
CEO Age	57.59	10.50	35.00	90.00
Number of Siblings	2.53	1.43	1.00	7.00
Firm Size (Employees)	118281.12	394923.35	228.00	2.30e+06
Return on Assets	7.73	7.41	-8.57	44.09
Return on Common Equity	16.61	21.26	-150.40	175.58

Note: Firm i, CEO c

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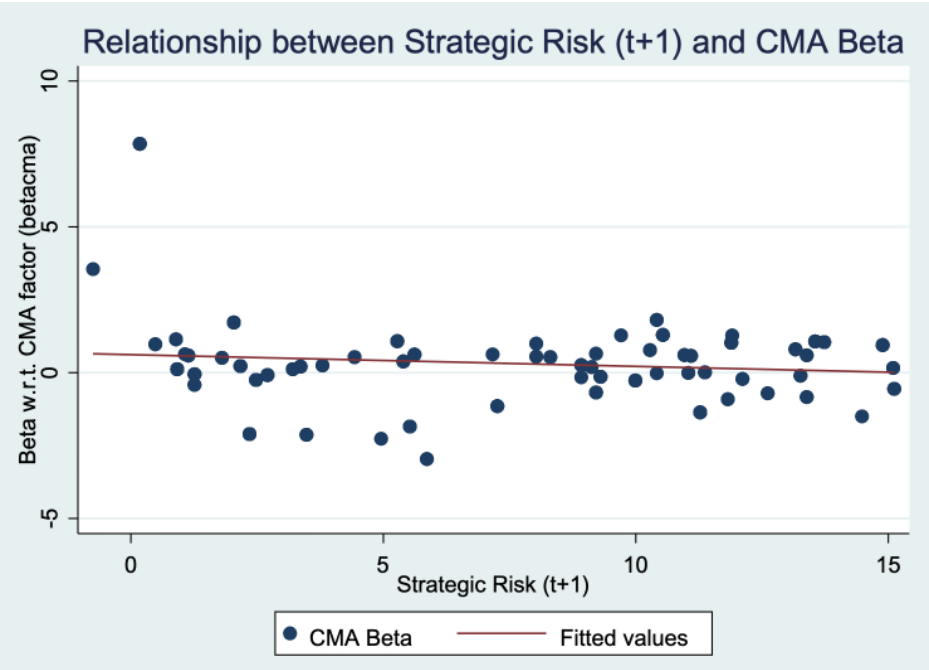
Comparison with Campbell et al. (2019)

$$\textit{Risk-taking}_{t+1} = \log(\text{CapEx} + \text{R\&D} + \text{Acquisitions})$$



	$\beta_{CMA,i,c}$	Strategic Risk (t-1)
$\beta_{CMA,i,c}$	1.000	
Strategic Risk (t+1)	-0.1278	1.000
	(0.0224)	

Notes: Entries are pairwise correlation coefficients with p-values in parentheses.

$\beta_{CMA,i,c}$ Regression

Model 5	Model 1 Base	Model 2 Birth Order	Model 3 Firm Age	Model 4 Female Siblings
		$\beta_{CMA,i,c}$		
CEO First born		0.79**	-4.53	-0.29
		(0.39)	(2.86)	(0.30)
Family CEO	0.32	0.77	0.81	1.07
	(0.83)	(0.90)	(0.89)	(0.86)
Firm Age (log)		0.20	-0.62	0.09
		(0.28)	(0.38)	(0.27)
CEO First born × Firm Age (log)			1.29*	
			(0.74)	
Female Siblings		-0.01	0.05	-0.36
		(0.26)	(0.25)	(0.30)
CEO First born × Female Sibling				1.58***
				(0.58)
CEO Age	-0.02	-0.02	-0.02	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Number of Siblings	-0.01	0.13	0.06	0.11
	(0.10)	(0.11)	(0.11)	(0.11)
CEO Change	0.51	0.37	0.55	0.26
	(0.47)	(0.45)	(0.48)	(0.44)
Family Generation Management	-0.17	-0.21	-0.22	-0.19
	(0.20)	(0.22)	(0.21)	(0.21)
Controls (ROE/ROA/..)	YES	YES	YES	YES
Sectors fixed effects	YES	YES	YES	YES
Observations	330	330	330	330
R^2	0.333	0.380	0.433	0.421

Note: The dependent variable is $\beta_{\text{CMA},i,c}$, the estimated factor loading on the Conservative-Minus-Aggressive (CMA) investment factor from the Fama–French *five*-factor model, serving as a proxy for strategic risk-taking (higher values indicate a more conservative investment orientation). Monthly factor returns are taken from the developed-markets Fama–French data library. Coefficients are estimated using OLS regressions of $\beta_{\text{CMA},i}$ on CEO birth order, interaction terms, and control variables, with sector fixed effects included. Standard errors are clustered at firm-level and are in parentheses. Statistical significance levels are $^{*}p < 0.10$, $^{**}p < 0.05$, and $^{***}p < 0.01$.

Results: Hypotheses confirmed

- ✓ **H1:** First-born CEOs adopt more conservative investment strategies (higher CMA beta).
- ✓ **H2:** The conservative impact of first-born status is stronger in older firms.
  - Supported: Firm age amplifies first-born conservatism.
- ✓ **H3:** The conservative impact of first-born status is stronger when the CEO has female siblings.
  - Supported: Female siblings reinforce caution.

Takeaway

All three hypotheses are empirically confirmed: First-born CEOs *systematically adopt more conservative strategies*, particularly in mature firms and when they have sisters.

Abnormal performance ($\alpha_{i,c}$)

- In general, no clear performance premium for first-born CEOs.
- **Model 3 and 5:** First-born status associated with lower α (–2.55 to –2.59, $p < 0.05$).
- Interaction with firm age is positive (+0.55, $p < 0.05$) $\Rightarrow$ effect attenuates in older firms.
- CEO changes consistently reduce α ($p < 0.05$).

Other factor loadings

- **Size factor (β_{SMB}):**
  - First-born CEOs show slightly lower small-cap exposure.
  - Effect moderated by firm age (interaction positive).
- **Value factor (β_{HML}):**
  - First-born CEOs linked to a stronger value .
  - Effect weakens with firm age and female siblings.

Takeaway

While other betas show some patterns (size, value), The most consistent and theoretically relevant effect is on β_{CMA}.

Robustness Checks

- **Alternative models:**
  - Using the 4-factor FF model (excluding RMW) yields consistent results.
  - Calculating rolling-beta on a 36-month window yields consistent results.
- **Subsamples:**
  - Results hold when focusing only on family CEOs
  - Results hold when focusing only on U.S. listings (with U.S. Fama-French factors).

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Conclusion and Contributions

- CEO birth order is a *measurable predictor* of strategic risk-taking: first-borns steer firms more conservatively.
- This conservatism manifests in capital market perspective and is especially valued in mature family firms
- Context matters: firm age and sibling composition reinforce these patterns.
- Broad contribution: connects early-life traits to market outcomes and suggests that investors and boards may consider demographic cues when assessing leadership style.

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