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## CEO gender and the probability that firms go public

Peter Frier<sup>a</sup>, Elizabeth O'neils<sup>b</sup>, Amin Sofla<sup>c</sup>, Oscar Stålnacke<sup>a,\*</sup><sup>a</sup> Umeå School of Business, Economics and Statistics, Umeå University, 90187 Umeå, Sweden<sup>b</sup> Division of Psychology and Language Sciences, University College London, London, UK<sup>c</sup> KU Leuven, Faculty of Business and Economics, KU Leuven, 3000, Leuven, Belgium

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### ABSTRACT

We study the association between the gender of the Chief Executive Officer (CEO) and the probability that firms go public through an Initial Public Offering (IPO), using data for the full population of Swedish IPO firms from 2005-2017, and matched private firms. We find that firms that go public are less likely to have a female CEO. The results are robust when we test for a change of CEO: firms that switch from a male to a female CEO are less likely to go public, and when we consider the gender balance among the board of directors.

### 1. Introduction

An initial public offering (IPO) is an important economic event in a firm's life cycle. IPOs allow firms to raise capital for investments, exploit favorable market conditions, and improve firms' visibility (Pastor et al., 2009; Maksimovic & Pichler, 2001). IPOs also carry risk: they reduce private control, are associated with fixed costs, and require the release of confidential information that may benefit competitors (Bhattacharya and Ritter, 1983; Maksimovic and Pichler, 2001). IPOs may also trigger organizational change in aspects such as corporate governance (e.g., Burton et al., 2004), planning and control (Von Eije et al., 2004), disclosure (e.g., Mather et al., 2000), and financial performance (e.g., Jain and Kini, 1994).

Despite the importance of IPOs in the trajectory of business growth, little is known about the link between the personal attributes of CEOs and board members, such as their gender, and the probability that firms go public (Cirillo et al., 2018; Talaulicar, 2020). Extant research suggests a link between CEO gender and corporate risk-taking, with male corporate leaders showing a greater appetite for exposing their firms to risk compared to their female counterparts (e.g., Sah et al., 2022). For instance, firms run by female CEOs are less leveraged (Huang and Kisgen, 2013), have less volatile earnings (Faccio et al., 2016), and have more conservative financial reporting (Francis et al., 2015). Given the risks associated with IPOs, these findings suggest that female CEOs may be less well represented in firms that go public.

However, since an IPO may trigger widespread organizational change there is also an opposing prediction. Findings suggest that female CEOs are more comfortable with change compared to their male counterparts (e.g., Musteen et al. 2006). For example, Paton and Dempster (2002) found that significantly more female than male managers identified strongly with change situations. Extant research also demonstrates that female executives have to prove themselves by showing greater initiative and a more entrepreneurial attitude (Maniero, 1994). Based on previous argumentation that an IPO triggers widespread organizational change, these findings

\* Corresponding author.

E-mail address: [oscar.stalnacke@umu.se](mailto:oscar.stalnacke@umu.se) (O. Stålnacke).

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suggest that female CEOs may be more, rather than less, likely to lead firms that go public.

We test whether firms that go public are more or less likely to be led by female CEOs using a novel dataset containing all private and IPO firms in Sweden during the period 2005-2017. We match the IPO firms to similar private firms and merge this dataset with individual-level data on CEO and director characteristics. The dataset thus enables us to observe the firms that go public and other similar firms that meet the listing requirements but remain private.

The results show that firms that go public are less likely to be led by a female CEO. We also study the change from a male to a female CEO at the time when the decision to go public was likely to have been made: three to five years prior to the IPO. The results are robust to this alternative definition and suggest that the probability that firms go public decreases with, on average, 24 percentage points if the CEO changes from male to female. We also observe that firms that go public have a lower proportion of female directors.

This is the first paper to report that the attributes of firms' decision makers are associated with the IPO and suggest that personal characteristics of top-level managers influence this important decision. This work extends previous studies that have investigated IPO decision-making using firm-level data related to financial performance and reporting (e.g., Lerner, 1994; Pagano et al., 1998; Chemmanur et al., 2010).

## 2. Data

We create a novel dataset that contains all IPO and private firms in Sweden (excluding banks and insurance companies) for the period 2005-2017 by combining data from four different sources. We identify all IPOs in Sweden using the Swedish Tax Agency's database on listed firms on Nasdaq Stockholm, First North, Spotlight, or NGM Equity. We identify directors for both the IPO and private firms using data from Bisnode. CEOs are identified using data from both Bisnode and Statistics Sweden. After identifying CEOs and directors, we merge these data with individual-level data (including individuals' educational attainments, demographics, and their previous work experience) from Statistics Sweden and firm-level data from the Serrano database.

After creating the dataset, we have a panel of 444 IPO firms. We match each IPO firm with a private firm at the year of going public<sup>1</sup>, using coarsened exact matching (CEM) (Blackwell et al., 2009), which creates a balanced control group for the IPO firms. Matching is based on the IPO year, industry, debt-to-equity ratio, natural logarithm of total assets, assets turnover ratio, current ratio, leverage ratio, interest rate on debt, and firm age. Industry is of particular importance since Pagano et al. (1998) find that the main factor affecting the probability of an IPO is the industry-specific market-to-book ratio. We conduct the matching with replacement and use CEM's auto-coarsening strategy, which attempts to divide the range of values for the numerical covariates into the number of bins required to approximate a normal density. Our final sample consists of 837 firms (427 IPO firms and 410 matched private firms, for whom complete data were available).<sup>2</sup>

## 3. Results

Appendix A presents the variable definitions for the variables used in the paper and in Table 1, we present the descriptive statistics. The control variables are chosen to capture the effects of the demographic, human capital, and social capital characteristics of firms' governance structures, which previous studies have shown to be important for firm decision-making (see Johnson et al., 2013 for a discussion). As seen, IPO firms are less likely to have a female CEO than the matched private firms. IPO firms also have a smaller proportion of female directors compared to the matched private firms. Further, IPO firms tend to have more highly educated CEOs and directors and are more likely to have CEOs and directors with previous IPO experience compared to the private firms. IPO firms also have larger boards, more outside directors, and are more likely to have directors from venture capital firms compared to the matched private firms.

Table 2 reports the results from six probit regressions with IPO as the dependent variable (1 = IPO firm, 0 = matched private firm) and with robust standard errors clustered at the industry level. Following Chemmanur et al. (2010), who show that the probability that firms go public varies between industries, we include industry-fixed effects. We further control for year-fixed effects to account for variations over time that could influence IPO issues and include the variables presented in Table 1 as controls. We control for ROA and firm age that Pagano et al. (1998) and Chemmanur et al. (2010) find to predict IPOs. We further include controls for the logarithm of total assets and total liabilities as proxies of firm size, which Chemmanur et al. (2010) find to be a strong predictor of IPOs. The presented coefficients are marginal effects.

The results show that firms are less likely to go public if the CEO is female. Columns 1-2 show the coefficient for CEO gender on the IPO date. To address the issue that the decision to take a firm public is made well in advance of the IPO date, Column 3 shows the coefficient for CEO gender three to five years before the IPO, or the matched year for the private firms. The results are robust to this alternative definition and indicate that firms that went public were 14% less likely to have a female CEO. Further, since Columns 1-3 show the results from correlations, we test the robustness of the results by considering changes from a male to a female CEO in the three-to-five-year period before the IPO. The results from these analyses are presented in Columns 4-5 and show that firms that went

<sup>1</sup> To ensure that the firms were also similar at the time when the IPO decision was likely to have been made, we re-ran the analysis on a sample matched three years before the IPO date. In untabulated analysis, we find that the matching of the IPO and private firms three years before the IPO does not change the main results. These results are available upon request.

<sup>2</sup> We have tested the robustness of the results using data for the full population of private firms. This analysis does not change the main results. The results are available upon request.

**Table 1**  
Descriptive statistics.

IPO firms (N=427) Private firms (N=410)	Mean	SD	Mean	SD	T-value
Female CEO	0.061	0.240	0.100	0.301	2.088**
Proportion of female directors	0.124	0.156	0.168	0.260	2.983***
CEO age	47.854	9.445	48.592	8.856	1.162
CEO educational attainment	4.589	0.984	4.276	1.005	-4.548***
CEO years of experience	3.439	3.744	4.702	4.099	4.651***
CEO founder	0.099	0.298	0.200	0.401	4.177***
CEO on the board	0.601	0.490	0.746	0.436	4.503***
CEO experience from IPO	0.103	0.305	0.024	0.155	-4.685***
Board size	6.005	2.013	4.428	2.079	-11.134***
Proportion of outside directors	0.880	0.187	0.698	0.368	-9.053***
Board age	53.495	6.843	51.681	8.371	-3.435***
Board educational attainment	4.670	0.576	4.255	0.859	-8.243***
Board experience from IPO	0.202	0.215	0.046	0.131	-12.633***
VC on the board	0.077	0.268	0.032	0.176	-2.903***
Firm age	10.235	13.628	17.296	20.150	5.953***
ROA	2.083	44.131	0.913	6.688	-0.531
Sales (ln)	6.715	4.014	9.266	3.190	10.141***
Total liabilities (ln)	9.230	1.904	10.189	1.719	7.627***

public were less likely to have switched from a male to a female CEO in the three-to-five-year period before the index date. The results in Column 5 suggests that firms that went public were 24% less likely to have changed from a male to a female CEO during this period.

Since the IPO decision is formally made by the board, we have included a number of controls for the board of directors' attributes in the analyses. Similar to the results for CEO gender we find that firms that go public are less likely to have a greater proportion of female directors on the board. The results in Column 5 further suggest that firms that went public were less likely to have changed from a male to a female chairperson three-to-five years before their index date. Further, we find that the marginal effects tend to be greater for directors compared to CEOs, where the strongest factor differentiating firms that went public vs. those that stayed private is the board's previous IPO experience.<sup>3</sup>

Finally, we address the issue of endogeneity, whereby firms that are more likely to go public might also be those more likely to appoint a male CEO, by using a Heckman model. In the first step we estimate a probit model in which the female CEO is the dependent variable and the CEO- and firm-level variables used in Table 2 are the independent variables. We present the results from this step in Appendix B. In Column 6 of Table 2, we present the results from the second step, where we estimate a similar model to that in Column 2 but also include the inverse Mills ratio. The result from this analysis remains the same as the overall results in the paper, suggesting that firms with female CEOs are less likely to go public.

#### 4. Conclusions

This paper extends prior IPO research by documenting that firms that go public are less likely to have female CEOs compared to matched firms that remain private. CEO gender is a significant factor differentiating firms that went public from those that stayed private, even after adjusting for the gender balance of the board, plus other CEO and director characteristics including previous IPO experience, proportion of highly educated and outside directors, and directors from venture capital firms.

This is, to our knowledge, the first paper that has explored whether CEO gender is associated with the probability that firms go public. This is an important extension to the IPO literature, which has so far mainly focused on firms' corporate governance after going public. By also observing similar private firms, we are able to provide new insights into how the characteristics of the CEO and the directors relates to the IPO. Our findings suggest that the personal attributes of top-level managers influence IPOs.

#### CRedit authorship contribution statement

All authors have contributed to each part of the paper. Oscar Stålnacke is the lead author and has had the main responsibility for the paper.

#### Data availability

The data that has been used is confidential.

<sup>3</sup> A final remark regarding Table 2 is that the Pseudo R<sup>2</sup> for each regression is higher compared to previous studies that have linked performance and accounting measures to the decision to go public. The best model among prior studies using these predictors explains about 25% of the variance in the likelihood of going public, while we report a Pseudo R<sup>2</sup> of 40% in Column 2 of Table 2. This indicates that the characteristics of CEOs and directors, and not only economic factors, are associated with whether a firm goes public.

**Table 2**  
Probit regressions for IPO.

	(1)	(2)	(3)	(4)	(5)	(6)
Female CEO	-0.140** (0.058)	-0.105* (0.053)				-0.112** (0.054)
Female CEO (3 to 5 years before IPO)			-0.139*** (0.049)			
Change from male to female CEO (3 to five years before IPO)				-0.228*** (0.064)	-0.240*** (0.062)	
Female Chairpersons (3 to 5 years before IPO)					-0.064* (0.036)	
Proportion of female directors		-0.152** (0.068)	-0.154* (0.079)	-0.166* (0.094)		-0.089 (0.062)
CEO age		-0.004** (0.002)	-0.003*** (0.001)	-0.004*** (0.001)	-0.006*** (0.002)	-0.010 (0.006)
CEO educational attainment		-0.001 (0.013)	-0.004 (0.018)	-0.002 (0.015)	-0.005 (0.015)	0.099 (0.114)
CEO years of experience		-0.003 (0.004)	-0.006** (0.003)	-0.003 (0.004)	-0.004 (0.006)	-0.019 (0.016)
CEO founder		-0.035 (0.045)	-0.020 (0.043)	0.020 (0.039)	0.026 (0.049)	-0.039 (0.045)
CEO on the board		-0.050 (0.036)	-0.061 (0.043)	-0.097*** (0.032)	-0.120*** (0.030)	-0.049 (0.039)
CEO experience from IPO		0.109 (0.067)	0.093 (0.081)	0.092 (0.085)	0.038 (0.126)	-0.552 (0.735)
Board size		0.066*** (0.007)	0.058*** (0.010)	0.054*** (0.012)	0.045*** (0.010)	0.061*** (0.008)
Proportion of outside directors		0.126** (0.064)	0.131** (0.056)	0.139** (0.067)	0.124* (0.066)	0.109* (0.061)
Board age		0.006*** (0.002)	0.006** (0.003)	0.007** (0.003)	0.014*** (0.003)	0.005*** (0.002)
Board educational attainment		0.080*** (0.015)	0.090*** (0.022)	0.122*** (0.014)	0.136*** (0.016)	0.082*** (0.018)
Board experience from IPO		0.546*** (0.083)	0.710*** (0.151)	0.619*** (0.186)	0.578*** (0.177)	0.619*** (0.089)
VC on the board		-0.014 (0.055)	0.036 (0.071)	0.052 (0.072)	0.001 (0.080)	-0.014 (0.058)
Firm age		-0.002* (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.004*** (0.001)	0.002 (0.004)
ROA		0.000 (0.000)	0.000 (0.000)	-0.007** (0.003)	-0.005*** (0.001)	0.000 (0.000)
Sales (ln)		-0.019*** (0.003)	-0.019*** (0.006)	-0.016*** (0.006)	-0.013** (0.006)	0.012 (0.033)
Total liabilities (ln)		-0.046*** (0.008)	-0.039*** (0.008)	-0.032*** (0.009)	-0.035*** (0.009)	-0.110 (0.075)
Inverse Mills ratio						0.836 (1.003)
Year FE	N	Y	Y	Y	Y	Y
Industry FE	N	Y	Y	Y	Y	Y
Observations	837	837	560	435	369	769
Pseudo R <sup>2</sup>	0.004	0.402	0.409	0.393	0.401	0.390

The table shows the marginal effects from probit regressions that test the relationship between female CEOs and the IPO decision. Standard errors are clustered at the industry level and are shown in parentheses. Significance levels:

\*\*\* p<0.01

\*\* p<0.05

\* p<0.10.

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## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.fr.2022.103615](https://doi.org/10.1016/j.fr.2022.103615).

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