Is Gender in the Pocket of Investors? Identifying Gender Bias Towards CEOs with a Lab Experiment

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#### Stylized fact #1

Women are under-represented in CEO positions.



Y axis: Percentage of female (yellow) and male (green) CEOs in 2019 among the 50 largest quoted companies across countries (X axis). Source: EIGE

#### Stylized fact #2

In the  $\mathsf{US}$ 

- Lee and James (2007): Stock markets in the US react more negatively to the appointment of a female CEO than to that of male CEO
- Subsample: US Firms announcements of CEO from 1990 to 2000.

In China

- Zhang and Qu (2016): Stock markets negative reaction to the appointment of female CEO also documented in China
- Subsample: CEO successions in companies listed in China's Shanghai and Shenzhen Stock Exchanges from 1997 to 2010.

#### Stylized fact #3

Women are under-represented also in finance related educational and professional arenas.

- In France, at ESSEC few female students specialize in finance (23% in the Master in Finance).
- In the US, 16% of holders of the chartered financial analyst (CFA) are women (Mattia, 2018).

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• In the US, 10% of equity funds are managed by women (Niessen-Ruenzi and Ruenzi, 2109).

## Our paper in a nutshell (1)

We contribute to shed light on the relation between these three stylized facts by arguing that:

 $\rightarrow$  the **negative stock market reaction** to female appointment can act as a **barrier to female CEO appointments** that is caused by the **investors' gender biases**.

### Our paper in a nutshell (2)

We rely on insights from sociology and **behavioral** economics, and we build a **trading experiment** to

- study how individual investors react to CEO appointments
- causally identify the role of investors biases
- **quantify** the role of investors' gender diversity on the aggregate stock market reaction

 $\rightarrow$  We find evidence of **gender bias** among investors which can contribute to explain the relation between facts #1, #2 and #3.

In particular, we distinguish between different sources of gender bias, and find evidence of **group bias** among male and female traders.

#### The rest of the talk: outline

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Conceptual framework and hypotheses Methodology Empirics Contributions and policy implications Future research

#### The CEO Job Market

The CEO job market for women

- supply-side barriers: objective and intrinsic differences between men and women
- demand-side barriers: barriers to women advancement in corporate hierarchies (the glass ceiling)

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#### Demand-side barriers

Glass ceiling barriers documented within organizations related to

- Corporate governance (the role of the board)
- Firm performance (the glass cliff effect)
- Industry ('female' versus 'male' industries)

Glass ceiling barriers external to the firm are less studied

• Media portray men and women differently (Lee and James, 2007, Dixon-Fowler et al. 2013)

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#### Demand-side barriers

We argue that the stock market reaction to female CEO appointment can act as a barrier

- Stock market investors feedback loop on corporate decisions
  - Investors may sell stocks when a female CEO is appointed which can influence the firm appointment decision ex-ante.

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#### Gender of CEOs and stock market reaction

Rational factors: adjusted perceptions of the CEO's impact on the firm's future cash flows (Fama, 1970)

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Behavioral biases: heuristics and stereotypes (Kahneman and Tversky, 2000)

#### Gender biases

We explore three theories of gender biases

- Gender stereotypes (lack-of-fit hypothesis)
- Double-standard theory (female leadership advantage)
- Group bias

To dig deeper into the mechanisms triggering the manifestation of these different types of bias, we draw from two key paradigms related to individual and social psychology

- Thinking system (Kahneman, 2011)
- Role of status (Mullen, Brown and Smith, 1992; Bettencourt et al. 2001)

#### Gender stereotypes

Gender stereotypes about female lack of (or weak) leadership abilities

- Lack of fit hypothesis (Heilman,1983)
- Role incongruity theory (Eagly and Karau, 2002) between gender roles (communal qualities) and leadership roles (agentic qualities)

Hypothesis 1: Stock market participants buy stocks when a male CEO is appointed and sell stocks when a female CEO is appointed.

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#### Double-standard theory

Stereotypes about female are reversed once (and because) they reach leadership positions

- Female leadership advantage and selection issues
- Foschi (1996, 2000) and Rosette and Tost (2010)

Hypothesis 2: Stock market participants buy stocks when a female CEO is appointed and sell stocks when a male CEO is appointed.

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#### Think fast, think slow

Kahneman's Thinking system

- Think fast: more prone to rely on stereotypes as cognitive shortcut
- Think slow: more prone to rely on complex reasoning

Hypothesis 3: Stock market participants reacting fast (fast thinkers) are more likely to exhibit trading behavior consistent with gender stereotypes (they sell when a female CEO is appointed) while stock market participants reacting slowly (slow thinkers) to the news are more likely to exhibit trading behavior consistent with double standards (they buy when a female CEO is appointed).

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### Group bias

 $\rightarrow$  Key: Research about gender stereotypes and double standard finds no difference as function of the gender of evaluators (Heilman, 2012; Rosette and Tost, 2010)

Yet, Tajfel (1970) argues that generic norms of group bias are 'extraordinarily easy to trigger off' and can take the form of

- In-group favoritism, out-group discrimination or both
- Investors' trading reaction may therefore reflect the investor group affiliation.

Hypothesis 4: Stock market participants exhibit in-group favoritism (they buy stocks when a CEO of their own gender is appointed) and out-group discrimination (they sell stocks when a CEO of the opposite gender is appointed).

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#### Group bias and status

Group bias is defined by Bettencourt et al (2001) as the difference between in-group favoritism and out-group discrimination.

Mullen, Brown and Smith (1992) first meta study on the impact of status on group bias found that high status groups tend to exhibit group biases with larger effect sizes.

• This asymmetry between high status and low status groups was only found in studies where status was an artificial category created in the lab, but not when it concerns a real category, such as gender.

Hypothesis 5: The effect sizes of the group bias for male stock market participants (high-status group) and the group bias for female stock market participants (low-status group) are symmetric.

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We design a lab experiment because we want to

- observe trading decisions at the individual level
- overcome two main challenges of empirical studies
  - 1. the paucity of real data: limited number of female CEOs
  - 2. the difficulty of making causal inference: omitted variable and reverse causality, strategic information release, limited attention by investors, information leaking...

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 $\rightarrow$  Randomized experiments are suited to unpack causal mechanisms

We use a **between-subject** design: each participant launches the simulation once

• In a random manner, participants face with equal probability either the variant of the simulation where the firm appoints a male CEO or the variant where the firm appoints a female CEO

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We define our control and treatment groups as follows:

- control group: male CEO
- treatment group: female CEO

Mixed gender participants

Recruited our participants among students enrolled in the Finance course at ESSEC

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Gender aspect of the research project was not revealed to the participants

Consequential experiment

The experiment is based on a trading simulation platform called SimTrade that allows us to

• contextualize our variable of interest: the gender of the CEO

At the launch of the simulation, participants are introduced to a **simulation scenario** that contextualizes the CEO appointment within a fictitious company named SunCar.

The following extract from the scenario shows how information is presented to participants:

"Due to a severe illness, Jacques Dallara, founder and CEO, will be relinquishing his operational duties soon. At midday, SunCar is expected to announce the name of his successor. The two candidates for the CEO position are Anna Farrell and Henry Villa."

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Our setting mimics the environment of practitioners in financial markets



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#### What would you do?

	Male CEO	Female CEO
Male participants	Buy? Sell?	Buy?
Female	Buy?	Buy?
participants	Sell?	Sell?

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# We collect data at the individual level for all 126 participants 56% are women, 44% men



#### Empirics

We capture the trading reaction of each participant along two dimensions.

Qualitative dimension

• Trading activity = Market participation × Order direction

Quantitative dimension

- Trading intensity = Trading activity × Quantity of stocks
- Trading intensity (*alternative version*) = Trading activity x Quantity of stocks x Probability of execution x Time lapse

For the qualitative dimension, we use a multinomial logit model For the quantitative dimension, we use a linear regression model

#### **Empirics**

Control variables: course grade and trading performance In the next version of the paper, we plan to

• control for the financial profile of participants by surveying participants at the end of the simulation

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#### Our conceptual framework and its operationalization





*Note:* This figure represents the relationship between the dependent, manipulated and moderating variables and the theoretical sources of gender bias (stereotypes, double standard of competence and group bias).

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#### **Descriptive statistics**

	Pooled simulations	Control group: Male CEO simulations	Treatment group: Female CEO simulations
Participant speed reaction	0.447 (0.499)	0.435 (0.499)	0.465 (0.504)
	0 / 1	0 / 1	0 / 1
Participant gender	0.563 (0.502)	0.591 (0.495)	0.527 (0.503)
	0 / 1	0 / 1	0 / 1
Market participation	0.833 (0.374)	0.873 (0.335)	0.781 (0.416)
	0 / 1	0 / 1	0 / 1
Order direction	-0.039 (0.915)	-0.056 (0.939)	-0.018 (0.374)
	-1 / +1	-1 / +1	-1 / +1
Quantity of stocks	42.14 (66.97)	34.23 (42.66)	52.36 (88.52)
	0 / 400	0 / 200	0 / 400
Time lapse	1.372 (0.472)	1.379 (0.478)	1.363 (0.468)
	0.000 / 1.917	0.167 / 1.917	0.000 / 1.917
Trading performance	-6,376 (9,818)	-6,654 (10,339)	-6,018 (9,183)
	-47,626 / +4,761	-47,626 / +4,087	-40,168 / +4,761
Course grade	11.21 (3.31)	11.15 (2.93)	11.31 (3.76)
	1.95 / 18.50	1.95 / 17.90	4.35 / 18.50
Observations	126	71	55

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#### Results: stereotypes, double standard and thinking system

	Dependent variable: participants' trading reactions			
	Trading activity		Trading intensity	
	(1)	(2)	(3)	(4)
Testano ant	-0.029	0.107	-7.714	-21.562
Intercept	(0.172)	(0.422)	(14.753)	(36.229)
CEO andar	-0.102	-0.100	-7.590	-7.513
CEO gender	(0.272)	(0.275)	(23.428)	(23.647)
D	-0.083	-0.092	-8.804	-8.572
Participant speed reaction	(0.260)	(0.266)	(22.356)	(22.871)
CEO gender ×	0.313	0.319	20.209	18.937
Participant speed reaction	(0.405)	(0.409)	(34.812)	(35.163)
Tradinanaformanaa		-1.84.10-8		2.61.10-3
frading performance		(1.00.10.5)		(8.64.10-4)
Course and a		-0.012		1.398
Course grade		(0.031)		(2.961)
Observations	105	105	105	105

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# Results: group bias

	Dependent variable: participants' trading reactions			
	Trading activity		Trading	intensity
	(1)	(2)	(3)	(4)
Intercent	0.241	0.578	2.642	-14.075
intercept	(0.403)	(0.817)	(20.406)	(39.240)
CEO condor	-0.860	-0.862	-47.367	-49.737
CEO gender	(0.618)	(0.621)	(26.679)	(29.822)
Dontinin out condon	-0.624	-0.608	-24.957	-26.836
Participant gender	(0.523)	(0.527)	(26.531)	(26.627)
CEO gender ×	1.685**	1.711**	78.123*	80.472**
Participant gender	(0.823)	(0.828)	(39.808)	(40.032)
Tradina norformanaa		5.89.10-6		1.02.10-3
Trading performance		(1.96.10.5)		(1.08.10-3)
Course grade		-0.027		2.210
Course grade		(0.063)		(2.996)
Observations	126	126	126	126

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#### Results: group bias and status

#### A. Male participants (high-status group)

	Participants' trading reactions			
	Trading activity		Trading	intensity
	(1)	(2)	(3)	(4)
In-group bias	+10.34	+0.55	-5.79	-9.39
Out-group bias	-23.07	-0.31	-25.34	-30.12
Group bias	+33.42	+0.86	+19.55	+20.74

#### B. Female participants (low-status group)

	Participants' trading reactions			
	Trading activity		Trading	intensity
	(1)	(2)	(3)	(4)
In-group bias	+17.24	+0.79	+7.89	+3.70
Out-group bias	-16.66	-0.06	-13.04	-17.37
Group bias	+33.90	+0.85	+20.94	+21.08

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# Further analysis (1)

How would varying gender diversity among stock market participants influence the aggregate market reaction?

We use the buying and selling proportions estimated from the data of our experiment

• to calibrate the probabilities of buying and selling

Doing so, we assume that the individual buying/selling behavior does not depend on gender diversity

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#### Further analysis (2)



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#### Further analysis (3)



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# Further analysis (4)

The threshold of female market participants that makes the market reaction gender-neutral to the appointment of a female CEO is equal to 82% !

• This is well above the current female representation in finance.

Our thought experiment implies that **the market is 'gendered'**, meaning that the gender composition of the market participants is not neutral to market outcomes.

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#### Three contributions

1. Provide a rigorous causal identification of the existence and nature of gender biases towards female and male CEOs in an investment context

2. Shed new light regarding the ongoing debate between supply-side and demand-side explanations in the glass ceiling literature

3. Provide a unified approach to testing different sources of gender bias towards female and male CEOs

#### Three policy implications

1. Efforts to deal with the underrepresentation of women in leadership positions should also consider interventions in finance (industry/education)

• These efforts could also improve social skills among investors at a moment where non-financial performance becomes increasingly relevant (ESG, etc...)

2. Training programs that aim at dealing with gender stereotypes may benefit from taking into account their interaction with group biases.

3. Measures to break demand-side barriers may involve the use of quotas or of remedies that address the fact that regardless of their qualifications, women have a harder time climbing the corporate ladder for reasons outside their control.

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#### Avenues for future work

Our experiment could be implemented in different environments to increase external validity

- In countries with different levels of gender inequality both at the societal level and in the financial sector (World Bank Group, 2018).
- In countries with varied cultural norms (Fernandez, 2013) and linguistic variations (Santacreu-Vasut, Shenkar and Shoham, 2014).
- Switzerland would be an interesting setting.

Regarding the gender of CEOs, further research could explore identity dimensions other than gender

The experiment that we developed on the SimTrade platform is available for the research community upon request.

#### Three take-aways from our research

1. We speak to the demand-side/supply-side debate about the rarity of women at the top, showing that demand-side factors are to be considered on their own

2. We show how using individual stock market behavior can help elucidate and distinguish between different sources of gender bias

3. We contribute to the gender and finance literature, which shows evidence of gender bias among venture capitalists, financial analysts, crowdfunding, showing gender bias also in a stock market investment context.

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Thank you for your attention !

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