Board gender-balancing and insider trading performance

B. Espen Eckbo
Tuck School of Business, Darthmouth College

Bernt Arne Ødegaard
University of Stavanger (UiS)

EFA, August 2021

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

(Legal) trading by corporate insiders

Primary Insider trades

Trades by executives or directors in own company stock.

Source of trading profit

Trades reflect knowledge/understanding/experience of

- Own company
- Industry in which company operates

This investigation

Norway
All (self) reported inside trades 1997–2016.
Investigate gender differences.

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Why gender and insider trades?

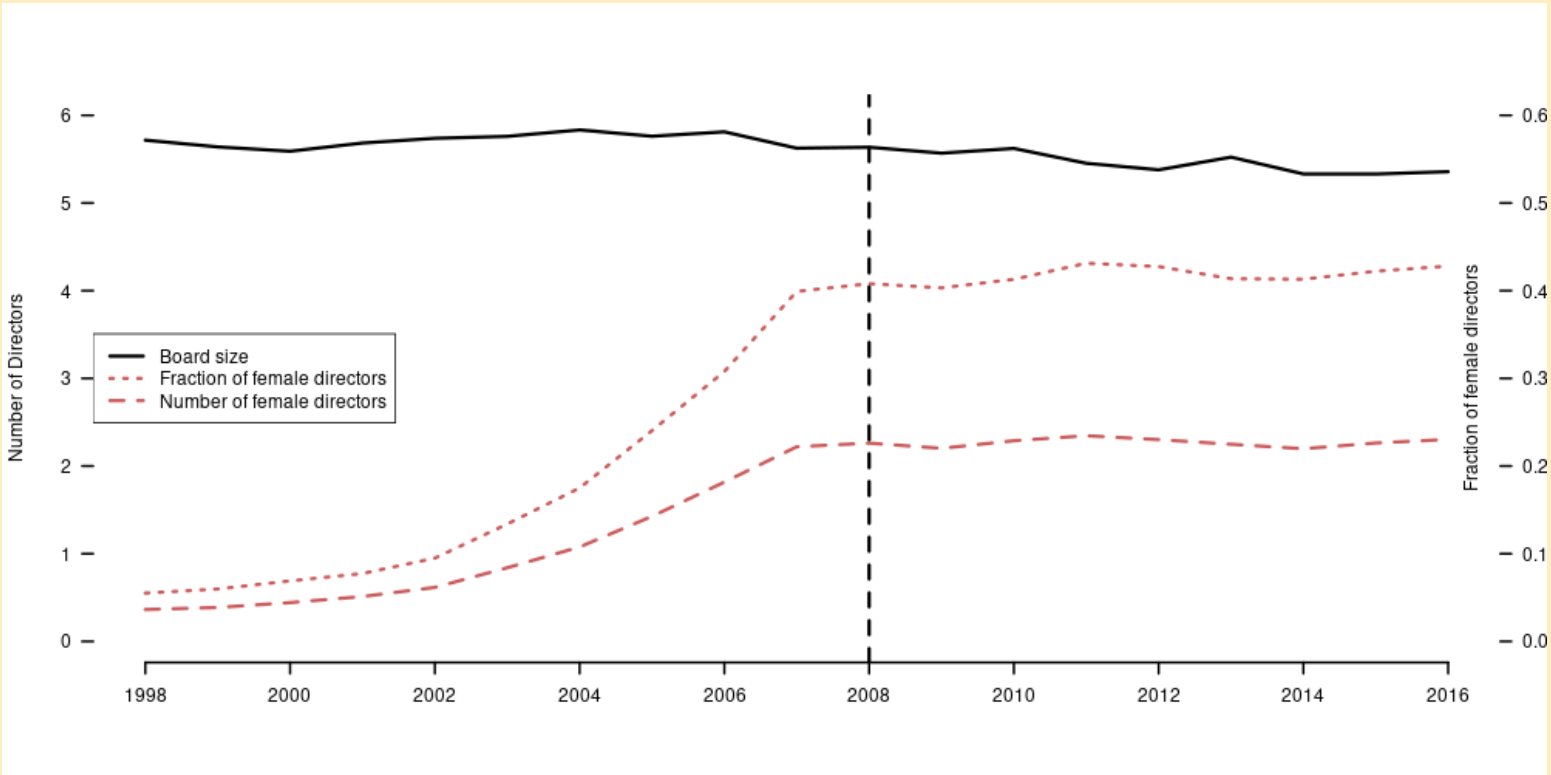
Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Sources of gender differences

- *Network* of insiders determine information
  - When females few, trades reflect less inside information
- Norway: Huge shock to gender-specific network
  Board reform – Enforce a 40% minimum female representation on boards of all OSE listed companies.
  (Eckbo, Nygaard, and Thorburn, 2021)

Norway's forced board gender-balancing

Fraction and number of females on boards. Firms listed on the Oslo Stock Exchange

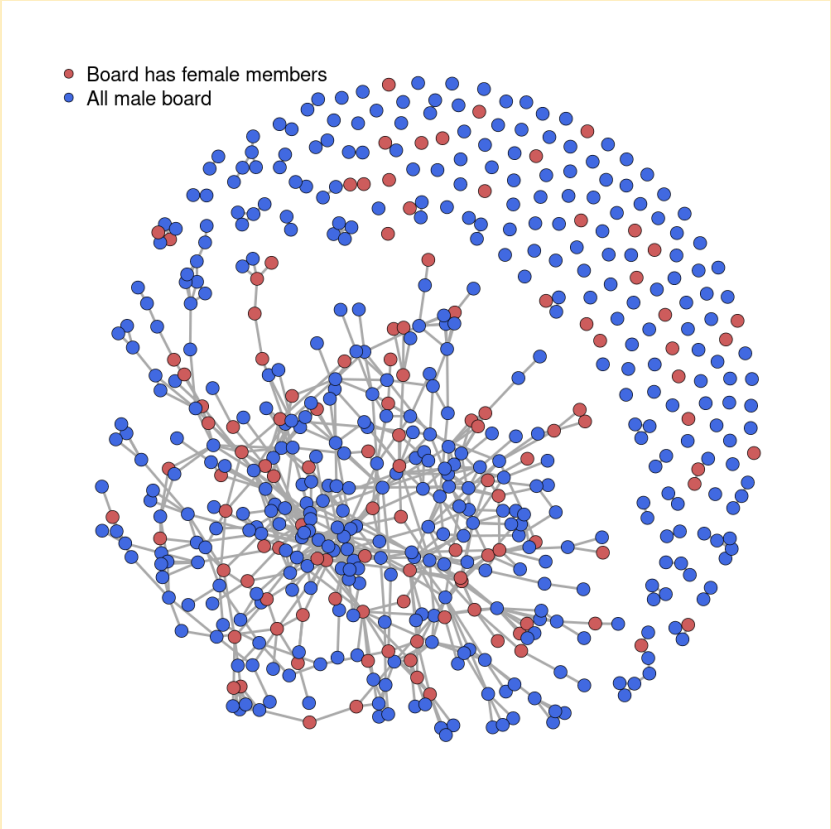


Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Norway's forced board gender-balancing

Evolving connectedness of board networks

2002



Blue: All male boards;

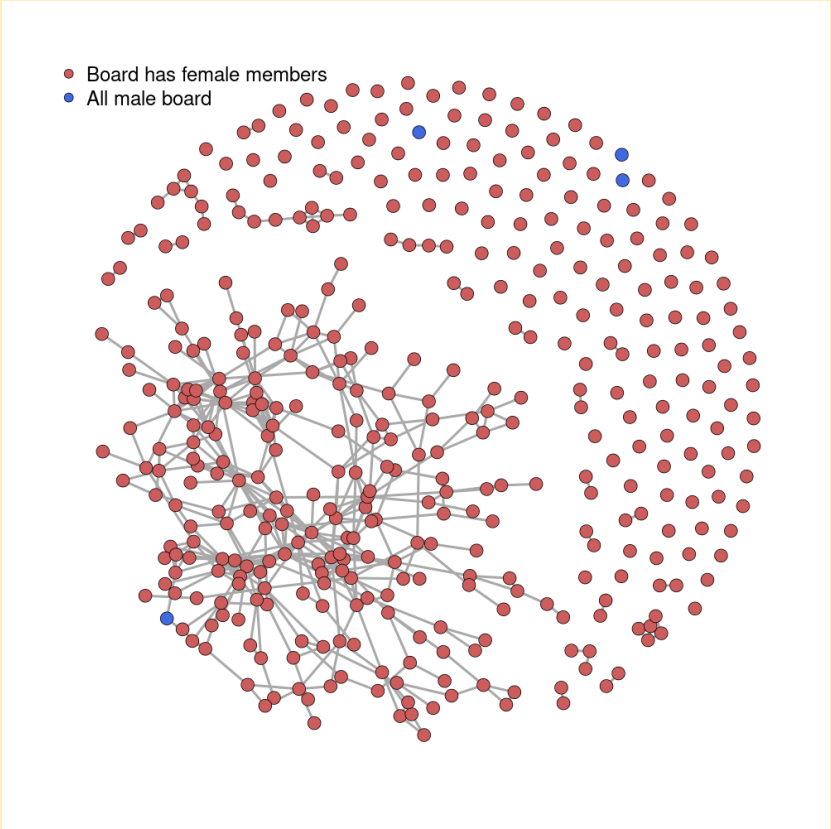
Red: Boards with at least one female director

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Norway's forced board gender-balancing

Evolving connectedness of board networks

2008



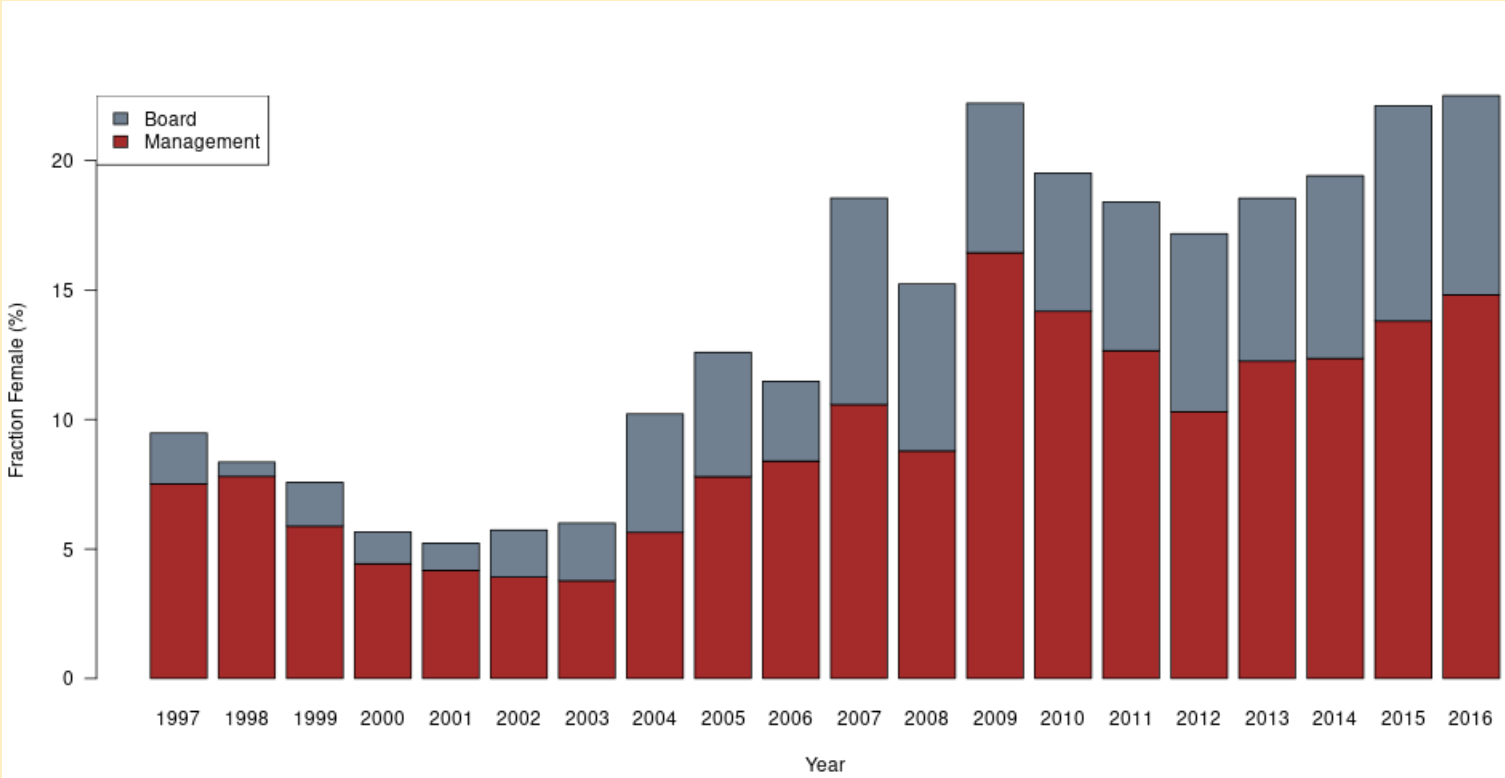
Blue: All male boards;

Red: Boards with at least one female director

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Data: Insider trades in Norwegian Listed Companies - 1997-2016

Fraction females among primary insider trades



Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Hypotesis 1 (insider performance)

The increase in the female director network caused by Norway's mandatory board gender-balancing enhances the value of female primary-insider information, which in turn translates into improved holdings-based insider performance.

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Hypotesis 1 (insider performance)

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Measure gender differences in

- Long term *performance* measuring the actual gains implied in insider's trading.

Construct portfolio matching insider trades

Ownership weights $\omega_{it}^{ow} \equiv (s_{it}/S_{it}) / \sum_{i=1}^{N_t} (s_{it}/S_{it})$

Value weights $\omega_{it}^{vw} \equiv h_{it} / \sum_{i=1}^{N_t} h_{it}$

s: insiders # shares
S shares outstanding
p stock price
$h = p \cdot s$ insider holding

Hypotesis 1 (insider performance)

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Performance evaluation

- Holdings-based evaluation
  - Do changes in (inside) portfolio predict performance?

$$HCM = \frac{1}{T-2}\sum_{t=2}^{T}\frac{1}{N_t}\left(\sum_{t=1}^{N_t} Cov\left(\Delta w_{it}, (r_{i,t+\tau} - E[r_{i,t+\tau}])\right)\right)$$

- Returns-based evaluation $\rightarrow$ Alpha (four factor)

$$\alpha_{pt}^{4f} \equiv r_{pt}^{e} - [\widehat{\beta}_p^m RMRF_t + \widehat{b}_p^2 SMB_t + \widehat{b}_p^3 HML_t + \widehat{b}_p^3 MOM_t]$$

Results of long term performance comparison

Point estimate: Females do (slighly) better.
Statistically: No significant performance differences

Hypothesis 2 (market reaction)

The increase in the female director network caused by Norway's mandatory board gender-balancing enhances the value of female primary-insider information, which in turn translates into a greater market reaction to the public announcements of female insider purchases.

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Hypothesis 2 (market reaction)

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Stock price reaction to announced insider trades reflect

- Timing by insiders (insider knowledge)
- Market's evaluation of the fact that an insider traded.

Method

Market reaction (CAR): Coefficient Γ in

$$r_{it}^e = a_i + b_i r_{mt}^e + \Gamma D_{it}^{event} + \varepsilon_{it}$$

Hypothesis 2 (market reaction)

Estimation results

Event windows:	$(-1,1)$	$(-1,5)$	$(-1,25)$	$(-1,50)$
A: Female Insiders 1997–2007				
CAR	**0.0039**	-0.0008	-0.0150	-0.0151
	(0.002)	(0.001)	(0.001)	(0.0005)
B: Male Insiders 1997–2007				
CAR	**0.0163*****	0.0148***	0.0117	0.0104
	(0.001)	(0.001)	(0.0003)	(0.0003)
C: Female Insiders 2008-2016				
CAR	**0.0154*****	0.0212***	0.0172	0.0161
	(0.002)	(0.001)	(0.001)	(0.0004)
D: Male Insiders 2008-2016				
CAR	**0.0167****	0.0083	-0.0141	-0.0429
	(0.002)	(0.002)	(0.001)	(0.001)

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Director's insider trades - is board network important for market reaction?

Determinants of CAR when directors trade

	Cumulative abnormal return (τ_1, τ_2)			
	$CAR(-1,1)$	$CAR(-1,5)$	$CAR(-1,20)$	$CAR(-1,50)$
	(1)	(2)	(3)	(4)
Constant	0.072^{***}	0.157^{***}	0.257^{***}	0.516^{***}
	(0.014)	(0.026)	(0.042)	(0.074)
MktCap	-0.004^{***}	-0.007^{***}	-0.012^{***}	-0.023^{***}
	(0.001)	(0.001)	(0.002)	(0.003)
TradeSize	−0.0002	−0.001	−0.0004	−0.002
	(0.001)	(0.001)	(0.002)	(0.003)
Network Centrality	2.147^{***}	1.614^{*}	3.144^{**}	0.276
	(0.482)	(0.886)	(1.462)	(2.565)
Observations	2,679	2,679	2,679	2,679
Adjusted R^2	0.015	0.013	0.016	0.018

Hypothesis 3 (insider risk aversion):

Since Norway's mandatory board gender-balancing placed male and female directors on an equal informational footing, these insiders agree on the extent to which the price decline caused by the financial crisis undervalues the firm's shares. Therefore, observed gender-based differences in the intensity of crisis-induced insider purchases (bets against the market) represent direct evidence of differences in risk aversion.

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Hypothesis 3 (insider risk aversion):

Gender differences in risk aversion?

In general

- Females more risk-averse than males (experimental studies) (Croson and Gneezy, 2009; Eckel and Grossman, 2008; Sapienza, Zingales, and Maestripieri, 2009)

However, female *executives*/*directors* not a random sample:

- Female executives and directors are, if anything, *less* risk averse than their male counterparts. (Adams and Funk, 2012)

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Hypothesis 3 (insider risk aversion):

Insider reactions to '08 fall in equity values

1. $\rightarrow$ buy stocks to rebalance portfolios.
2. $\rightarrow$ higher potential for inside view to differ from consensus view (increase inside holdings if positive view).

Risk aversion's influence on this decision

More risk averse:

1. $\rightarrow$ Less equity in optimal portfolio
2. $\rightarrow$ Less willing to lower diversification to concentrate holdings in own company stocks.

Prediction

More risk averse individuals will buy less equity following the fall in stock values.

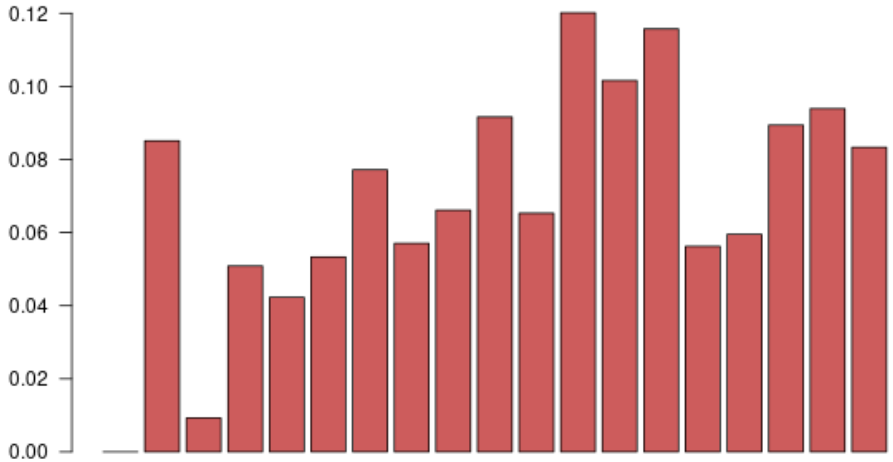
Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Hypothesis 3 (insider risk aversion):

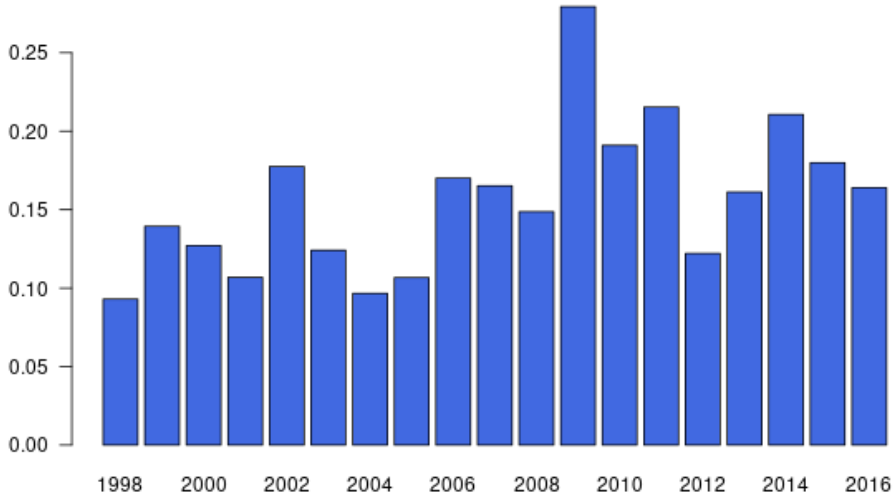
Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Probability of a trade among directors

Females



Males



Key takeaways

Gender based performance differences?

→ No evidence that primary insiders "buy low or sell high", whether male or female.

Board reform: Influx of female directors

→ Market reacts *more positively* to trades by female directors after board reform.

Financial crisis and risk aversion

→ Female directors increase equity buying during crisis.

→ Fails to support the notion that female directors are more risk averse than their male colleagues.

Introduction
Why gender and inside trades?
Norway's forced board gender-balancing
Hypothesis 1: insider performance
Hypothesis H2: market reaction to insider trades
Is network important for CAR?
Hypothesis H3: insider trades and risk aversion
Conclusion
References

Renée B. Adams and Patricia Funk. Beyond the glass ceiling: Does gender matter? *Management Science*, 58(2):219–235, 2012. doi: 10.1287/mnsc.1110.1452.

Rachel Croson and Uri Gneezy. Gender differences in preferences. *Journal of Economic Literature*, 47:448–474, 2009.

B Espen Eckbo, Knut Nygaard, and Karin S Thorburn. Valuation effects of Norway's board gender-quota law revisited. *Management Science*, 2021. doi: 10.1287/mnsc.2021.4031. Forthcoming.

Catherine C Eckel and Philip J Grossman. Men, women and risk aversion: Experimental evidence. *Handbook of experimental economics results*, 1:1061–1073, 2008.

Paola Sapienza, Luigi Zingales, and Dario Maestripieri. Gender differences in financial risk aversion and career choices are affected by testosterone. *Proceedings of the National Academy of Sciences*, 106(36):15268–15273, 2009.