Board Gender Diversity and Spillover Effect

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What we do and what we find

- We use the world-wide board gender diversity reforms as a quasi-natural experiment to study how the board gender diversity of firms affects the firm value around the world.
- We find that after the reform in the origin country, the Jensen's alphas of the firms are significantly higher, the beta of the firms are significantly lower, and price synchronicities of firms are significantly lower.
- Our empirical results support the finding that board gender diversity promotes innovations (Griffin, et al, 2021).

Change in Culture

Mary T. Barra became the chief executive officer (CEO) of General Motors (GM) on January 15, 2014. She is the first female CEO of a major global automaker.

Motivation

- Over the years, researchers have used various theoretical frameworks and analytical tools to evaluate the relationship between **board gender diversity** and **firm financial performance**.
- The results, however, have remained largely inconclusive.
- Supportive: Brahma et al (2021) , Duppati et al (2019), etc.
- Non-supportive: Marinova et al (2016) , Pandey et al (2023) , Marquez-Cardenas, et al (2022), etc.

Motivation (cont’d)

- Over the past 5 years, cultural, legislative, and governance factors have strongly influenced board diversity resulting in an increase of women directors serving on U.S. public company boards
  - Women now hold 30% of board seats across the S&P 500, relative to 18% held five years ago.
  - Female directors have better attendance than their male counterparts on board meetings.
  - However, increased diversity is not a panacea! The relationship between gender diversity and corporate performance is complex!

- In 2018, Women on Boards (SB 826) was signed into law to advance equitable gender representation on California corporate boards.
  - California led the way as the first state in the nation to require all publicly held domestic or foreign corporations whose principal executive offices are located in California to have at least one female director on their boards by December 31, 2019, either by filling an open seat or by adding a seat.
  - By December 31, 2021, such publicly held corporations were required to have minimum numbers of female directors based on the total size of the corporation's board of directors.

Contribution of this paper

- We adopt a quasi-natural experiment, the world-wide board gender diversity reforms, and to test whether firms experience better performance after the reforms. This will help identify the causation from board gender diversity to firm performance.
- Many countries have implemented board gender diversity reforms, either through legislation or by revising governance codes for board appointments.
- These reforms aim to enhance women's representation and influence in leadership roles, and it has been proved in the literature that enhanced women's representation and influence in leadership roles will change the fundamentals of the firm: they significantly improve innovation outcomes (Wang et al, 2024).

The reform

Countries/Regions	ISO code	Main Reform	Main Reform type	First Reform	First Reform type
Austria	AT	2009	C	2009	C
Australia	AU	2013	R	2010	C
Belgium	BE	2012	R	2009	C
Denmark	DK	2013	C	2008	C
Spain	ES	2007	R	2006	C
Finland	FI	2010	C	2010	C
France	FR	2011	R	2010	C
United Kingdom	GB	2012	C	2010	C
Greece	GR	2013	C	2013	C
Hong Kong China	HK	2013	C	2013	C
Ireland	IE	2012	C	2012	C
Italy	IT	2011	R	2011	R
Luxembourg	LU	2009	C	2009	C
Malaysia	MY	2011	C	2011	R
Netherlands	NL	2013	C	2009	C
Norway	NO	2006	R	2003	R
Poland	PL	2010	C	2010	C
Sweden	SE	2004	C	2004	C
Singapore	SG	2012	C	2012	C
Thailand	TH	2011	C	2011	C

The reform

- There are two types of reforms documented in Wang et al (2024):
- (1) rule-based reforms, which are established through legislation (legal authority) without allowing firms to explain non-compliance, and
- (2) comply-or-explain reforms, which are either governance codes that recommend adherence while allowing firms to justify departures from recommendations or legislated, requiring compliance but permitting firms to explain instances of noncompliance

Sample

- We use the daily data for all available firms (30,425 firms) in Datastream of 64 countries.
- The sample period is [-2 year, -1 year] vs [+1 year, +2 year] of each reforming country's year of main reform.
- Since we do not have the specific dates of reform, we do not check the cumulative abnormal returns (CARs).
- Instead, we check the Jensen's alpha as a proxy for the underlying firm's performance in the sample period.
- In each year, we regress the daily excess return of stock i in year T on the daily excess return of the benchmark market indices and obtain the ***Jensen's alpha***, ***beta***, and ***R-square***.

Results

Table 2

We use the following DID model:

$$Y_{ijT} = \alpha + \beta_1 Mdummy_{ijT} + \beta_2 Test_{jT} + \beta_3 Mdummy_{ijT} * Test_{ij} + \gamma Control'_{ijT} + \delta_T + \theta_c + \varepsilon_{ijT}$$

where Y_{iT} is Jensen's α for firm i, country j in year T. $Mdummy_{ijT}$ is a dummy variable which equals 1 if market j where stock i is listed has already adopted the Reform in year T, and 0 otherwise. $Test_{ij}$ is a dummy variable that equals 1 if market j where stock i is listed is from the test group and 0 for control group. $Control'_{ijT}$ is the transpose of the vector of control variables for stock i, market j in year T. δ_T and θ_c capture the time- and continent-fixed effect. ε_{ijt} is the error term.

	(1) alpha	(2) alpha	(3) alpha	(4) alpha
mdummy	0.844***	0.001	0.831***	0.014**
	[12.42]	[0.21]	[12.17]	[2.19]
test	-2.785***	-3.025***	-2.732***	-3.133***
	[-9.01]	[-9.64]	[-8.21]	[-9.27]
mdummy*test	4.074***	3.217***	4.562***	3.587***
	[12.43]	[9.61]	[13.59]	[10.46]
Constant	-0.767***	-0.310***	-4.874***	-4.442***
	[-9.19]	[-4.19]	[-17.76]	[-16.53]
Time fixed effect	no	yes	no	yes
Control var	no	no	yes	yes
Continent fixed effect	yes	yes	yes	yes
R-square	0.0096	0.0606	0.019	0.0698
# of obs.	591866	591866	591023	591023

Note: *, ** and *** represent significance levels at 10%, 5%, and 1%, respectively.

Results

Table 3: The Channel

Panel A: Beta

	(1) beta	(2) beta	(3) beta	(4) beta
mdummy	-0.038***	0.000	-0.048***	0.000***
	[-26.51]	[-1.51]	[-33.18]	[2.93]
test	-0.014	-0.049***	0.035***	0.000
	[-1.46]	[-5.17]	[3.48]	[-0.02]
mdummy*test	-0.118***	-0.070***	-0.093***	-0.037***
	[-19.08]	[-11.00]	[-14.73]	[-5.59]
Constant	0.844***	0.824***	0.775***	0.750***
	[273.18]	[282.66]	[90.28]	[87.24]
Time fixed effect	no	yes	no	yes
Control var	no	no	yes	yes
Continent fixed effect	yes	yes	yes	yes
R-square	0.0257	0.0371	0.118	0.1323
# of obs.	591866	591866	591023	591023

Note: *, ** and *** represent significance levels at 10%, 5%, and 1%, respectively.

Panel B: Price synchronicity

	(1) syn	(2) syn	(3) syn	(4) syn
mdummy	-0.311***	0.003***	-0.338***	0.006***
	[-51.96]	[5.11]	[-56.14]	[8.66]
test	-0.167***	-0.328***	0.001	-0.155***
	[-4.14]	[-8.17]	[0.02]	[-3.47]
mdummy*test	-0.720***	-0.454***	-0.660***	-0.348***
	[-27.14]	[-17.07]	[-24.11]	[-12.62]
Constant	-2.162***	-2.325***	-2.761***	-2.922***
	[-171.96]	[-190.91]	[-71.60]	[-75.60]
Time fixed effect	no	yes	no	yes
Control var	no	no	yes	yes
Continent fixed effect	yes	yes	yes	yes
R-square	0.0126	0.0505	0.1143	0.1563
# of obs.	591866	591866	591023	591023

It seems that the channel of higher ***alpha*** is from lower ***beta*** and lower ***price synchronicity***.

Results

Table 4: Comply vs Rule

The results show that the Alpha increase appears mainly in the **Comply-or-explain based reforms**, but not in the **Rule-based ones**, consistent with Wang et al (2024) that comply-or-explain based reforms promote more innovations.

	Comply				Rule-based			
	(1) alpha	(2) alpha	(3) alpha	(4) alpha	(5) alpha	(6) alpha	(7) alpha	(8) alpha
mdummy	1.971***	-0.039***	1.992***	-0.041***	-1.903***	0.342***	-2.085***	0.442***
	[25.05]	[-4.49]	[25.28]	[-4.71]	[-17.54]	[10.06]	[-19.03]	[11.81]
test	-3.431***	-3.068***	-2.735***	-2.278***	0.63	-1.284*	-0.68	-3.045***
	[-10.67]	[-9.40]	[-7.65]	[-6.30]	[0.96]	[-1.93]	[-0.93]	[-4.10]
mdummy*test	5.311***	4.800***	6.267***	5.566***	-1.222*	-2.185***	-1.423**	-2.661***
	[14.70]	[12.93]	[16.96]	[14.61]	[-1.72]	[-3.10]	[-1.99]	[-3.76]
Constant	-0.662***	0.389***	-4.482***	-3.318***	-1.041***	-2.163***	-6.105***	-7.702***
	[-7.53]	[5.17]	[-15.76]	[-11.98]	[-10.79]	[-26.39]	[-20.85]	[-27.01]
Time fixed effect	no	yes	no	yes	no	yes	no	yes
Control var	no	no	yes	yes	no	no	yes	yes
Continent fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
R-square	0.016	0.0545	0.0246	0.0628	0.005	0.0694	0.0229	0.0854
# of obs.	419211	419211	418434	418434	172655	172655	172589	172589

Results

Table 5

We use the following Diff-in-diff-in-diff model (DDD) in our heterogeneity test:

$$Y_{ijT} = \alpha + \beta_1 Mdummy_{ijT} + \beta_2 Test_{jT} + \beta_3 MAS_j + \beta_4 Mdummy_{ijT} * Test_{ij} + \beta_5 Mdummy_{ijT} * MAS_j + \beta_6 MAS_j * Test_{ij} + \beta_7 Mdummy_{ijT} * Test_{jT} * MAS_j + \gamma Control'_{ijT} + \delta_T + \theta_c + \varepsilon_{ijT}$$

The results show that the reform impact is more prominent in countries with lower MAS scores.

mdummy	3.134***	2.607***	2.989***	2.095***
	[13.31]	[12.76]	[12.34]	[9.89]
test	7.696***	6.704***	14.727***	15.942***
	[10.56]	[9.13]	[16.48]	[17.54]
mas	0.090***	0.096***	0.188***	0.216***
	[22.56]	[24.00]	[25.66]	[28.17]
Test*mas	-0.095***	-0.072***	-0.129***	-0.126***
	[-7.54]	[-5.60]	[-9.72]	[-9.42]
Mdummy*mas	0.053***	0.054***	0.155***	0.182***
	[13.63]	[13.92]	[21.00]	[23.79]
Mdummy*test*mas	-0.052***	-0.057***	-0.075***	-0.105***
	[-4.12]	[-4.40]	[-5.57]	[-7.61]
Constant	-6.372***	-6.296***	-15.313***	-16.297***
	[-22.68]	[-23.06]	[-27.42]	[-28.99]
Time fixed effect	no	yes	no	yes
Control var	no	no	yes	yes
Continent fixed effect	yes	yes	yes	yes
R-square	0.0133	0.0656	0.0269	0.0809
# of obs.	577576	577576	576733	576733

Results

Table 6: Robustness with different windows

Our results are robust over different windows.

Panel A: [-2,0) vs (0,+2]

	(1) alpha	(2) alpha	(3) alpha	(4) alpha
mdummy	1.662***	0.010**	1.574***	0.016***
	[21.11]	[2.22]	[20.01]	[3.35]
test	-1.285***	-3.362***	-1.076***	-3.353***
	[-4.85]	[-12.50]	[-3.71]	[-11.42]
mdummy*test	1.097***	1.977***	1.382***	2.346***
	[4.32]	[7.33]	[5.33]	[8.49]
Constant	-0.934***	-0.014	-4.653***	-3.746***
	[-11.27]	[-0.20]	[-17.89]	[-14.82]
Time fixed effect	no	yes	no	yes
Control var	no	no	yes	yes
Continent fixed effect	yes	yes	yes	yes
R-square	0.0119	0.0709	0.024	0.0821
# of obs.	1182061	1182061	1180360	1180360

Note: *, ** and *** represent significance levels at 10%, 5%, and 1%, respectively.

Future work

- More detailed reform information with specific dates.
- Main reform vs first reform?
- Parallel trend test? (Maybe Synthetic DID or placebo tests)

Conclusion

- We use the world-wide board gender diversity reforms as a quasi-natural experiment to study how the board gender diversity of firms affects the firm value around the world.
- We find that after the reform in the origin country, the Jensen's alphas of the firms are significantly higher, the beta of the firms are significantly lower, and price synchronicities of firms are significantly lower.
- Our empirical results support the finding that board gender diversity promotes innovations (Griffin, et al, 2021).