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Realizing Gender Diversity on Corporate Boards

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ABSTRACT

This study examines the effectiveness of soft law through scrutinizing national policies for enhancing the proportion of women on corporate boards. Soft laws, which have less precision and obligation dimensions than conventional laws, are widespread within financial regulation. Despite this widespread use there relative performance is unexplored. To resolve this, we undertake a comparative examination of 14,012 firms from 99 nations, using a three-stage analysis to examine the effect of different policies, their format and influence of institutional factors on female board representation. We report that soft laws are effective for promoting gender equality on corporate boards. The effectiveness of policies is strongly influenced by the enforcement, implementation and compliance dimensions of policy, and institutional factors. Policies are most potent when enforced using a moderate level of sanctions, with a longer compliance period and a diversity target less distant from a firm's precedent gender diversity level.

1. Introduction

Soft law develops when the precision, delegation and obligation dimensions of law affecting enforcement, implication and compliance are weakened (Abbot et al. 2000). This form of law is used distinctly and emphasizes the expressive function of law rather than its deterrence power (McAdams 2000). While much financial regulation including anti-money laundering and corporate governance employs soft law extensively (Choudhury 2018), the effectiveness of this legal form is untested. This study examines the relative effectiveness of soft law through scrutiny of national policies for enhancing the proportion of women on corporate boards. This investigation explores the different dimensions of soft approaches adopted internationally and associated institutional influences.

Some nations have addressed these concerns by using public legal methods and requiring a quota of women on boards is achieved; these are forms of soft law with

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greater levels of precision. Other nations have used soft law methods with lower levels of precision and greater ambiguity in the enforcement of rules. These would include corporate governance codes (Cuomo, Mallin, and Zattoni 2016) and promoted principle-based 'comply or explain' methods and voluntary regulatory solutions. International policies to ensure greater gender equality on boards encapsulates these different and often contradictory approaches for enacting corporate policies (Aguilera et al. 2006). As soft law, 'comply or explain' principles or voluntary methods have been reported to be both less (Grosvold, Brammer, and Rayton 2007) and more effective (Labelle, Francoeur, and Lakhal 2015) than more precise methods such as legislative quotas. There is uncertainty as to the optimal policy approach to enhance women's representation on boards.

In exploring how regulation and policies should be designed, applied and interact with their institutional context (Labelle, Francoeur, and Lakhal 2015, Terjesen, Aguilera, and Lorenz 2015; Mensi-Klarbach and Seierstad 2020), we engage with multiple theoretical areas. Initially, we explore how soft laws (Abbott and Snidal 2000; Choudhury 2018) are used in accounting, financial and business regulations (Ford 2008) to achieve goals, such as gender equality on corporate boards. Using goal setting theory (Locke and Latham 1984), we then examine how policy design maybe enhanced and identify the attributes of a more effective policy, further investigation is timely. The analysis employs a data panel of 14,012 firms and 109,715 firm-year observations over the period between 2000 and 2021. This sample includes firms from thirty nations with gender diversity policies and further sixty-nine nations with no recognized policies. Within the assessment we examine the effectiveness of the policy approaches. We then evaluate the enforcement, implementation and compliance dimensions of policies. Lastly, we examine whether institutional differences affect the policy outcomes.

We report that legislative quotas, 'comply or explain' principles and voluntary methods all are effective in promoting gender diversity on corporate boards. Moreover, this policy effectiveness is influenced by how policy is implemented, enforced, and complied with. Policies are more effective when the level of sanctions is moderated, compliance period is longer, and a diversity target is less distant from a firm's precedent gender diversity level. Lastly, institutional factors also influence policy effectiveness.

This study is timely for many reasons. At a time when the veracity of financial regulation is increasingly questioned (Ashton et al. 2021), it is important to comprehend how well regulatory approaches such as soft law operates. To date there is a paucity of work examining the efficacy of these legal approaches despite soft law being used in multiple areas of financial regulation, across corporate governance, in multiple areas of corporate social responsibility and to tackle corruption and slavery in the workplace (Choudhury 2018). We build on qualitative and theoretical studies, such as by Mensi-Klarbach and Seierstad (2020) and perform a comprehensive cross-country quantitative study to examine the effectiveness of various forms of frameworks designed to increase female representation on corporate boards.

Secondly, the case used to examine this issue is important in its own right. Women provide valuable human capital (Tatli, Vassilopoulou, and Özbilgin 2013) for enhancing board monitoring (Adams and Ferreira 2009), fostering strategic change (del Carmen Triana, Richard, and Su 2019), developing sustainability (Liao, Luo, and Tang 2015;

Haque and Jones 2020), earnings management (Gull et al. 2018) and improving organizational performance (Campbell and Mínguez-Vera 2008; Xing, Gonzalez, and Sila 2021). Throughout the study we therefore assume enhanced gender diversity in the boardroom delivers a wealth of other organisational benefits (Biswas, Roberts, and Stainback 2021) and focus on how well different policy approaches can be employed to improve the gender balance of corporate boards internationally. Despite governments across the world have introduced policies to enhance the representation of women on boards, the progress remains slow. As of 2021, only 19.7 percent of all directors across 72 countries are women, a figure rising from 16.9 percent in 2018 and 15.0% in 2016 (Deloitte 2022). We contribute to this process through identifying more effective forms of policy.

Lastly, despite developments and interest from various arenas, the issue of gender quotas internationally is still not well-developed because comprehensive and systematic studies are lacking. As highlighted by Kirsch's (2018) comprehensive review, recent studies of board gender quotas have highlighted regulatory issues, which tend to follow one of two streams. One explores the antecedents of regulations, e.g., institutional and cultural contexts (e.g., Terjesen, Aguilera, and Lorenz 2015) or the influences of actors (e.g., Seierstad et al. 2017); the other stream investigates the effects of regulations mainly on economic performance, mostly with mixed results. Few studies focus on comparative analysis of the use, design and impact of regulations, as this research area is still dominated by country-specific studies (Kirsch 2018). We extend the existing comparative research (Grosvold, Brammer, and Rayton 2007, Labelle, Francoeur, and Lakhal 2015, Mensi-Klarbach and Seierstad 2020) by examining inter- and sub-national differences in policies critical for shaping corporate board gender diversity (Thams, Bendell, and Terjesen 2018). Mensi-Klarbach and Seierstad (2020) explore the use of gender quotas on corporate boards in ten European countries by performing a qualitative study. They propose a framework for understanding various quota designs suggesting that institutional design affects the choice of the appropriate regulatory framework. We extend this study by empirically examining the efficiency of various regulatory frameworks in achieving higher female representation on boards in a cross-country setting that includes not only European, but also countries from other geographical areas.

The study is organized as follows. After this introduction, we examine different soft law approaches used to attain gender equality on boards, the design of these policies and wider institutional influences. We then report the data employed, before detailing the testing framework. Findings are reported in four sections, including descriptive results, the effectiveness of policy approaches, how policy dimensions influence policy outcomes and institutional effects. Lastly, we present the conclusions.

2. Literature review

2.1. Policy approaches to achieve gender equality on boards

A miscellany of soft law policies are used to improve the gender equality of boards. Many nations use legislation to specify more precise soft law methods such as quotas for women on boards (Seierstad et al. 2017; Mensi-Klarbach and Seierstad 2020). These rules-based standards often involve bright-line thresholds (Kadous and Mercer 2012),

include scope and legacy exceptions and have a high level of detailed and extensive implementation guidance. Other nations have baulked at such direct intervention, preferring soft law methods with less precise targets and more ambiguous obligations and enforcement. These methods include principle-based methods, 'comply or explain' approaches, moral suasion, or voluntary frameworks whereby firms have some choices and flexibility in how they respond to requirements for changes (Keay 2014; Klettner, Clarke, and Boersma 2016).

These policy approaches are mostly applied at the national level and principally affect larger companies (Table 1). There are twenty-four countries or states that have legally mandated gender quotas for corporate board membership. After Norway passed laws requiring all public companies have at least 40% women directors on corporate boards, other nations or states within a nation including Austria, Belgium, Chile, France, Germany, Iceland, India, Israel, Italy, Kenya, Netherlands, Morocco, Portugal, South Korea, Switzerland, California, Illinois, Maryland, New York, and Washington in the USA have introduced gender quotas (Deloitte 2022). A further twelve nations or states within a nation (Denmark, Finland, Luxembourg, Malaysia, Spain, Poland, Romania, Sweden, Turkey, Vietnam, and Massachusetts and Pennsylvania in the USA) have implemented regulatory 'comply or explain' principles. Four countries (Australia, Canada, Mexico, and the UK) adopted even less precise voluntary methods, encouraging gender equality on boards while allowing corporations to manage this change.

Public and private interest perspectives provide a theoretical backdrop for evaluating these legal forms (McCraw 1975). From a public interest perspective, an active role for government is predicated on the existence of market failures and the need for consumer protection. From this standpoint, an appropriate response to limited representation of women on boards would be the use of relatively more precise soft laws and regulation such as legislative gender quotas. In contrast, a private interest view holds that markets can resolve most market failures without government intervention. Hence, a greater reliance is placed on market discipline, information disclosure, with a light regulatory hand paramount (Shleifer 2005). Reflecting these private interest concerns, soft law 'comply or explain' principles and voluntary methods are more appropriate methods to enhance gender diversity on boards, as they allow firms some choice in how they comply.

How nations intervene to ensure more women are appointed to corporate boards reflects this wider theoretical debate as to whether legislation and rules or principle-based 'comply or explain' regulation is more appropriate. Unsurprisingly, these policies have generated mixed results and unintended consequences. In line with the public interest perspective, some studies have empirically compared the effectiveness of voluntary approaches instead of legislation (Grosvold, Brammer, and Rayton 2007), reporting legislation encourages more diversity growth. Distinctly, Labelle, Francoeur, and Lakhal (2015) evaluated the effectiveness of regulatory relative to voluntary approaches embedded within corporate governance codes with respect to firm performance. In favor of private interest perspective, regulatory approaches are reported to be less effective than the voluntary approach, as an accelerated increase in the demand for more female directors may create a shortage of qualified women. Hence, regulatory means are costly by compelling firms to appoint less experienced women on boards in a short time frame. This ambiguity is concerning as these public and

Table 1. Description and classification of approaches to promote women on the board by country (Source: Deloitte, 2021).

Country	Policy	Initiation date	Compliance Date	Quotas/ Target	Sanctions	Scope
Austria	Quota	2018		30%		Listed companies
		2020		40%		The state has a majority stake & supervisory board
Australia	Voluntary	2015	2018	30%	None	Listed companies
Belgium	Quota		2017	33%	Refilling & delay pay	Large companies
			2019	33%		Small and medium-listed companies
Canada inc. Quebec)	Voluntary	2020		50%	None	Listed companies
Denmark	Principles	2013		40%	Disclosure	Public listed companies, large non-listed companies, government-owned limited liability companies, and government institutions
Finland	Principles	2016		40%	None	Listed companies
France	Quota	2017		40%	Refilling & delay pay	Publicly traded companies and governmental organizations, and to private companies with revenues or total assets of over €50 million that have 250 or more employees
Germany	Quota	2016		30%	Refilling & delay pay	Listed companies with full employee representation on their supervisory boards
		2021		At least one woman on the executive board		Listed companies with full employee representation on their supervisory boards (more than 2,000 employees)
Greece	Quota	2021		25%	Lawsuits	Listed companies
Iceland	Quota	2010		40%	None	Public and private limited liability companies (with more than 50 employees)
India	Quota	2013	2015	At least 1 WoB	Fines & refiling	Listed companies and other large public limited companies
		2018	2020	At least 1 female independent director	Fines	The largest 1,000 listed companies, as ranked by market cap
Israel	Quota	2011		Single gender boards must add other gendered members in new non-executive director appointments.	None	Listed companies
Italy	Quota	2011	2018	33%	Fines, lawsuits & refiling	Listed companies
		2020		40%		
Luxembourg	Principles	2013	2019	40%	None	State-owned companies & listed companies

Table 1. Continued.

Country	Policy	Initiation date	Compliance Date	Quotas/ Target	Sanctions	Scope
Malaysia	Quota	2011	2016	30%	None	Companies with more than 250 employees
	Principles	2021		30%	Disclosure	Listed companies
Mexico	Voluntary	2018			Disclosure	Listed companies
Netherlands	Principles	2013	2017	30%	Disclosure	Large companies
	Quota	2022		35%	Refilling	Supervisory boards of listed companies and required large Dutch companies, whether listed or not
Morocco	Quota	2021	2023	30%	None	Listed companies
			2026	40%	None	Listed companies
Norway	Quota	2003	2008	40%	Dissolution & lawsuits	Listed companies, state-owned enterprises, intermunicipal companies, large cooperatives, and companies that are more than two-thirds municipally owned
Poland	Principles	2016			None	Companies listed in Warsaw Stock Exchange & partially state-owned companies
Portugal	Quota	2018	2018	20%	Disclosure & fines	Listed companies
		2018	2020	33.30%	Disclosure & fines (only for listed companies)	Listed companies and the supervisory boards of state-owned enterprises
Romania	Principles	2016			Disclosure	BSE-listed companies
Spain	Quota	2015		30%	Rewards	Listed and non-listed companies
	Principles	2020	2022	40%	Disclosure	Listed companies
South Korea	Quota	2020	2022	At least 1 WoB	None	Certain large public companies
Sweden	Principles	2015	2020	40%	None	Listed companies
			2017	35%		Larger companies
			2017	30%		Smaller companies
Switzerland	Quota	2021	2025	30%	Disclosure	Boards in listed companies with more than 250 employees
			2030	20%	Disclosure	Executives in listed companies with more than 250 employees
Turkey	Principles	2012		25%	Disclosure	Listed companies
UK	Voluntary	2011	2012	25%	Disclosure	FTSE 100
		2013	2015	25%	Disclosure	FTSE 250
		2015	2020	33%	Disclosure	FTSE 350
		2020	2025	40%	Disclosure	FTSE 350&largest 50 companies by sales
USA (California)	Quota	2018	2019	At least 1 WoB*	None	Public companies
			2021		Fines	Public companies
USA (Illinois)	Principles	2015	2018	At least 3 WoB	None	Public companies
	Quota	2019			Disclosure	Public companies
USA (Maryland)	Quota	2019			Disclosure	Public companies
	Quota	2020			Disclosure	

Table 1. Continued.

Country	Policy	Initiation date	Compliance Date	Quotas/Target	Sanctions	Scope
USA (New York)						Public and private corporations
USA 2022	25%		Disclosure	(Washington) Public corporations	Quota	2020
USA 2018	At least 3 WoB	None	Public	(Massachusetts) corporations	Principles	2015
USA 2020	0.3	None	Public	(Pennsylvania) corporations	Principles	2017
Vietnam	Principles	2019		30%	None	Public companies

Countries with no quotas: Croatia; Czech Republic; Estonia; Latvia; Hungary; Lithuania; Ireland; Luxembourg; Romania; Russia; Slovakia; Turkey; Middle East/United Arab Emirates; Argentina; Brazil; Peru; Trinidad and Tobago; China; Indonesia; Japan; Korea; Philippines; Singapore; Thailand; Australia; New Zealand; Nigeria; South Africa. Canada (Quebec) has gender quotas only for state-owned companies and all government entities, none for public listed companies. Chile, Colombia and Kenya have gender quotas only for state-owned companies or companies with more than 50% state. US (California) introduced gender quotas and precisely require company to have at least one female director if the board has up to four members, two female directors if the board has five members and three if the board has six or more members by 2021.

private, legislative, regulatory "comply or explain" principles and voluntary approaches are seen globally, allowing us to test:

> **H₁:** More precise soft law approaches such as gender quotas are the most effective in increasing the number of women appointed to corporate boards.

2.2. Goal setting and the design of policy

2.2.1. Theoretical background: Goal setting theory

These mixed policy outcomes reflect the considerable variation in both in the form of policies, their dimensions and the different national institutions affecting corporations. This study uses goal-setting theory to illuminate issues related to different legal dimensions, sanctions, targets and timings within policy. Goal Setting Theory has been used for decades to motivate people to perform better in work-related tasks by setting and monitoring goals. Without the proper goal formulation, many good intentions are doomed to fail (Norcross, Ratzin, and Payne 1989). Advances in social psychological goal setting have helped improve our understanding of formulating effective targets.

In the case of gender diversity regulation, diversity goals are often quantified in a number or percentage of women on boards providing clarity and allowing firms to measure their progress (Lunenburg 2011). Some sanctions are also important to ensure compliance (de Cabo et al. 2019), but excessive sanctions maybe self-defeating (Cooter 1984). For example, some firms view a fine as a price worth paying and fewer sanctions may lead to greater compliance (Mann, De Ridder, and Fujita 2013). For example, in Norway, legislative gender quotas have enhanced board representation of women and simultaneously encouraged 30–50 percent of ASA companies (Norwegian public limited companies) to delist and avoid compliance (Ahern and Dittmar 2012; Bøhren and Staubo 2014).

We also consider the time over which the policy is enacted (Carver and Scheier 1982) and the discrepancy between current and desired states. Compliance dates or phase-in periods either limits compliance (Reichman 1992) or motivates firms to comply (Locke 1968). For instance, firms prefer distant future goals to more proximate goals (Taylor and Shepperd 1998). When the compliance period is longer than needed, progress can slow to fill the available time (Parkinson and Osborn 1957) and infinite compliance periods, as used in Iceland, are associated with limited goal completion. Quotas have also been seen to have an immediate effect in the year legislation is implemented and then a decreasing influence (Dahlerup and Freidenvall 2005). Other policy characteristics include the discrepancy between current and desired states (Carver and Scheier 1998). If the threshold for women's representation is far from a firm's current gender diversity level, firms are more likely to reject targets (Englich, Mussweiler, and Strack 2006, Locke and Latham 1984). In sum, goal characteristics are likely to have a range of effects in the formulation of appropriate policy approaches. Therefore, we argue, different forms of policy implementation, enforcement, and compliance may strengthen or weaken the capacity of policy to increase board gender diversity. We therefore test:

> H_2: The sanctions, timing, form and proximity of policy goals influence the effectiveness of gender quality policy

2.3. National, regional and firm level institutional influences

Most existing studies examining the issue of corporate board quotas focus on single countries (Wang and Kelan 2013; Palá-Laguna and Esteban-Salvador 2016). This study answers the call for research examining the interplay between diffusion and institutional factors (Teigen 2012) by assessing the impact of national and regional characteristics on the efficacy of board quotas.

A recent qualitative study by Mensi-Klarbach and Seierstad (2020) has identified that the introduction of regulation at national level is influenced by a country's unique institutional and cultural context. As embedded institutional environments influence how organizations respond to regulations (Whitford and Tucker 2012), we assume that institutional structures enable or constrain board diversity through context, technical pressures, and societal expectations (Meyer and Rowan 1977). For example, many country-level determinants such as the gender distribution of the labor force (Bertrand et al. 2019), dominant institutions including government, family, education, religion, and firm characteristics affect women's presence on corporate boards (Grosvold and Brammer 2011; Grosvold, Rayton, and Brammer 2016).

While most countries have homogeneous governance systems, some nations such as the USA, have federal structures, providing individual states or regions with the legal power to influence board composition. In the states enacting policies, significant variation in women's board representation exists (Thams, Bendell, and Terjesen 2018). This may arise from different regional opportunities. For example, Massachusetts has a larger pool of women in careers associated with boardroom roles than Tennessee (Bellar, Helms, and Arfken 2012). Other nations, such as members of the European Union are bound by common international laws and regulations. Subsequently,

legislative quotas are pervasive across Europe; the European Commission promoting gender balance in European Union listed companies since 2016. Unlike USA with a relatively friendly legal environment for shareholder activism, Europe lacks shareholder representative democracy (Dobson, Rastad, and Philosophy Documentation Center 2018). USA, therefore, relies on endogenous mechanisms of shareholder proposals that gender diversity resolutions brought by shareholders, whereas Europe on exogenous government mandated quotas (Perrault 2015). We argue that these institutional differences are responsible for variation in board gender diversity. We therefore test:

H$_3$: National and regional institutional characteristics influence board diversity.

3. Methods and data employed

3.1. Data sources and the sample employed

Our data sources are BoardEx and Thomson Reuters Eikon, which provide corporate board and accounting information respectively. As the BoardEx dataset starts in 2000 and only covers public limited companies, we examine gender diversity on corporate boards between 2000-2021. Colombia, Chile and Kenya are excluded as their policies focus on state-owned companies. After removing observations with missing values, a panel dataset of 99 countries over 22 years including 14,012 firms and 109,715 firm-year observations, is created.

The distribution of sample nations and firms is provided in Table 2. Overall, 3,793 firms and 13,899 firm-years across 24 countries face legislative measures, 1,220 firms and 3,830 firm-years across 12 countries are subject to regulatory 'comply or explain' principles and 1,151 firms and 3,937 firm-years have engaged with voluntary methods. Malaysia and Spain moved from a legislative framework to a 'comply or explain' regulatory principles after 2021 and 2020 respectively. Similarly, the United States (Illinois) moved to a mandatory quota in 2019 after using a 'comply or explain' regulatory principles (Deloitte 2022).

The firm-years affected by policy measures are used as a treatment group, and unaffected firm-years form the control group. For example, in 2003, Norway introduced legislation requiring all publicly listed boards have 40 percent of women on boards by 2008. All publicly listed companies in Norway from 2003 onwards are included in our treatment group, whereas the control group includes firm-years between 2000 and 2002. The treatment group consists of 6,725 firms across 27 countries or states within a nation, whereas the control group is composed of 10,790 firms and 82,062 firm-years.

In assessing these legal dimensions, we focus on the different sanctions, targets and timings within policy. Table 3 outlines the policy dimensions and formats observed in different nations including three panels displaying the varying combinations of quotas, 'comply and explain' principles and voluntary approaches to implementing soft law. To test hypothesis 2, we create dummy variables indicating each dimension and format of different policy approaches and introduce interaction terms in our baseline model examining whether these dimensions interplay between the effectiveness of promoting gender equality and policy approaches.

Table 2. Distribution of sample firms across countries.

Country	Firm-years	No. Firms	Country	Firm-years	No. Firms
Argentina	10	94	Malta	7	38
Australia	1157	7881	Mauritius	2	6
Austria	49	481	Mexico	74	531
Azerbaijan	1	16	Monaco	1	5
Bahamas	3	29	Mongolia	1	11
Bahrain	2	6	Morocco	10	39
Bangladesh	3	13	Namibia	1	7
Barbados	1	4	Netherlands	162	1466
Belgium	104	1112	New Zealand	88	487
Bermuda	7	57	Nigeria	21	174
Botswana	1	1	Norway	231	1443
Brazil	128	776	Oman	1	6
Bulgaria	1	1	Pakistan	13	49
Canada	264	1717	Panama	2	21
Cayman Islands	1	10	Papua New Guinea	5	52
Chile	36	244	Peru	13	49
China	391	2254	Philippines	72	354
Colombia	9	56	Poland	48	275
Croatia	4	33	Portugal	43	428
Cyprus	18	129	Puerto Rico	3	26
Czech Republic	5	30	Qatar	9	32
CÃ'te D'ivoire	1	6	Republic Of Ireland	114	1216
Denmark	92	671	Romania	4	17
Egypt	11	26	Russian Federation	53	441
Estonia	2	5	Saudi Arabia	49	141
Finland	127	884	Senegal	1	2
France	632	5508	Serbia	1	4
French Guiana	1	3	Singapore	506	2466
Gabon	1	16	Slovakia	1	1
Germany	524	4467	Slovenia	2	19
Greece	34	317	South Africa	197	1602
Guernsey	18	152	South Korea	82	413
Hungary	11	56	Spain	140	1415
Iceland	6	51	Sri Lanka	27	104
India	895	5098	Sweden	328	2349
Indonesia	106	512	Switzerland	205	1846
Isle Of Man	9	69	Taiwan Territory of	4	31
Israel	160	1386	Tanzania	1	4
Italy	245	1531	Thailand	72	241
Jamaica	1	9	Trinidad And Tobago	4	23
Japan	531	3663	Turkey	49	270
Jersey	24	192	Ukraine	3	39
Jordan	2	7	United Arab Emirates	27	137
Kazakhstan	2	5	United Kingdom	2172	19458
Kenya	6	37	United States	3185	30426
Kuwait	12	31	Vietnam	15	49
Lithuania	1	2	Virgin Islands British	4	21
Luxembourg	54	431	Virgin Islands U.S.	1	4
Malaysia	250	1414	Zambia	3	19
			Zimbabwe	2	3
Total number of firms	140,12		Total number of firm-year observations		109,715

Table 3 (Panel A) shows the frequency and distribution of policy measures and their sanctions. Overall, 37.03% of our sample has no sanctions, whereas 62.97% with one or more sanctions. We identify six forms of sanctions including refilling, fines, lawsuits, dissolution, disclosure, and delayed pay. Refilling requires non-compliant firms leave a vacancy empty until a woman is found. Fines are monetary penalties paid by non-compliant firms; for example, Italian firms are fined from €100,000 to €1,000,000 if the

Table 3. Distribution and frequency of policy dimensions.

Panel A: Sanction					
No sanction	2,258(37.03%)		Sanction	3,839 (62.97%)	
	Quota		Principles	Voluntary	
Refill	8,944		0	0	
Fine	6,411		164	0	
Lawsuits	1,437		0	0	
Dissolution	392		0	0	
Disclosure	962		998	1,335	
Delay pay	4,215		0	0	
Panel B: Compliance date					
No compliance date	8,580 (39.60%)				
Transition period	Obs	Mean	St. Dev.	Min	Max
Quota	6,814	3.23	1.70	2	7
Principles	2,395	4.13	1.31	0	5
Voluntary	3,416	5.30	3.30	0	10
Panel C: Target of women on boards					
"At least"*	6,627				
N/A	1,202				
Percentage	13,837				
Percentage	Obs	Mean	Std. Dev.	Min	Max
Quota	7,402	0.34	0.05	0.25	0.40
Principles	2,889	0.37	0.05	0.25	0.40
Voluntary	3,546	0.31	0.05	0.25	0.50
Distance from compliance*					
Quota	6,694	0.13	0.14	−0.40	0.40
Principles	2,509	0.14	0.14	−0.35	0.40
Voluntary	3,313	0.16	0.13	−0.37	0.40

*"At least": some policy set up the target of women on board by putting it as "at least xx women on boards", rather than the percentage or none. *Distance from compliance reports the subsample of firms in the countries with the gender quota in percent only, excluding which in numbers.
We identify three policy dimensions, a) sanctions, b) compliance date, c) the target. These are shown in panel A. We categorize sanctions into six forms, i.e. refilling, fines, lawsuits, dissolution, disclosure and delay pay. The dimensions of compliance date (Panel B), includes whether this has been set and the length of transition period. The target dimensions (Panel C), includes if the target is phrased in numbers or percentage terms.

percentage of women on supervisory boards is less than 33%. One to note that we also consider the case of Spain has the sanction of fines though there are no sanctions for noncompliance. The government shows preference in rewarding contracts to organizations that do comply, which can be considered as a loss/punishment for non-compliant firms. Non-compliant firms in other countries, such as Greece, can be sued and sent to the administrative courts. We call these sanctions *lawsuits*. Dissolution is a sanction whereby non-compliant firms are delisted, and are used, for example, in Norway. Other countries including Belgium, punish non-compliant firms by suspending directors' benefits or using *delayed pay* sanctions. Legislative quota measures have the greatest variety of sanctions with the maximum of 3 sanctions at a time, while 'comply or explain' principles and voluntary methods only have one sanction: the *disclosure* of non-compliance.

Table 3 (Panel B) presents the time between expected compliance and implementation for the three policy approaches. Legislative quotas have an average 3.23-year phase-in period, with a minimum of 2 year and maximum 7 years. The phase-in period for regulatory 'comply or explain' principles vary from 0 to 5 years with a mean of 4.13 years. Voluntary methods, have an average phase-in period of 5.30 years. Overall, 39.60% of firms face no specific compliance date.

Table 3 (Panel C) reports the target number or percentage of women expected to be represented on corporate boards. While some nations state this target numerically, such as '*at least x women on boards*', most indicate an expected percentage. For example, Norway, France, Italy, and Belgium require a certain percentage of women board members, while India, South Korea and the United States (Illinois) mandate one to three women should sit on the board. Other countries, such as Poland and the United States (Maryland, New York and Washington), do not specify a target at all and just encourage greater gender diversity on corporate boards. In Table 3 (Panel C), quota percentage targets range from 25% to 40% of board seats occupied by a woman. 'Comply or explain' principles have an average target of 37% women on boards and targets for voluntary approaches range from 25% to 40%.

Table 4 outlines our variables and the treatment and control group descriptive statistics. At the country level, GDP growth and inflation are considered as macro-economic indicators and the percentage of female labor force is used as a control for gender imbalance in labor market entry. At the firm level, we consider board characteristics, including board size, average number of qualifications held by directors, the number of years that directors have served on boards, and firm characteristics including firm size (the log of total assets) and operating profits as control variables.

3.2. The testing framework

As women's representation on boards increases over time, it is difficult to identify if an increase in board gender diversity results from policy interventions, institutional effects or merely the passage of time (Hughes, Paxton, and Krook 2017; Isidro and Sobral 2015). We address this by focusing on the relationship between policy measures and gender diversity, rather than examining the effects of gender diversity.

We first examine the impact of three soft law approaches; legislative quotas, 'comply or explain' principles and voluntary methods. We visualize the change in the percentage of women on boards for each policy approach in Figure 1. The X-axis displays an event time window of [-3, 3] with the year of implementation denoted Year 0. We observe the percentage of women on boards' increases over time regardless of policy measures. Figure 2 depicts the implementation of policy over time. Quotas, 'comply or explain' principles and voluntary methods are captured in a 5-year window. The figure shows that quotas and regulatory principles have a continuous impact on gender diversity, whereas voluntary approaches have a limited impact similar to which of no policies.

To examine if this trend arises from policy implementation or is a naturally occurring phenomenon, we use propensity score matching – difference in differences (PSM-DID) approaches. The propensity score matching (PSM) is an approach to address sample selection and confounding bias and endogeneity concerns by matching treatment firms with control firms which are as similar as possible. Reported in Table 5, Columns (1)-(3) focus on treatment firms, subject to quotas, regulatory principles and voluntary methods respectively. The three dummy variables that proxy these policy approaches are dependent variables within probit models with all other control variables as regressors (shown in Table 4). A firm's propensity score is then obtained to classify treatment and control group, which effectively captures information on

Table 4. Definitions and measures of firm- and country-level characteristics that may influence board gender diversity.

		Treatment								Control	
						Principles					
		Total (Obs = 21,666)		**Quotas** (Obs = 13,899)		(Obs = 3,830)		**Voluntary** (Obs = 3,937)		Obs = 88,049	
Firm-level factors		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Gender ratio	The percentage of women on boards	0.20	0.15	0.21	0.14	0.22	0.15	0.17	0.15	0.11	0.12
Firm size	The log of total assets	7.26	2.71	7.52	2.78	7.22	2.19	6.34	2.71	6.83	3.18
	Total assets (in $millions)	0.05	1.63	0.07	2.04	0.01	0.05	0.01	0.09	0.40	5.65
Board size	The number of directors on boards	9.15	5.11	9.56	4.92	8.93	4.63	7.91	5.96	9.20	5.78
Independence	The percentage of non-executive directors on boards	0.76	0.18	0.75	0.17	0.84	0.17	0.72	0.18	0.68	0.22
Educational level	Average number of educational qualifications held by directors	1.88	0.68	1.86	0.69	1.89	0.62	1.98	0.70	1.74	0.74
Experience	Directors' average number of years on boards	0.82	0.99	0.82	0.99	0.73	0.93	0.89	1.03	0.87	1.07
Operating income	Total Revenue less total operating expense (in $millions)	4.60	89.34	6.54	111.42	1.22	4.22	1.05	6.36	45.08	835.57
Country-level factors											
Labor supply	The proportion of women working as a fraction of all women	49.66	13.27	45.74	14.63	55.42	6.77	57.91	3.85	55.25	6.40
GDP Growth	Percentage change in GDP relative to the previous quarter	1.84	3.90	1.89	4.35	1.71	2.93	1.76	2.95	1.95	2.82
GDP Deflator	The ratio of GDP in current local currency to GDP in constant local currency	2.30	2.10	2.37	1.69	2.65	3.21	1.74	1.91	2.26	3.69

The data has been obtained from BoardEx and Thomson Reuters Eikon. The descriptive statistics are reported for the treatment and the control group.
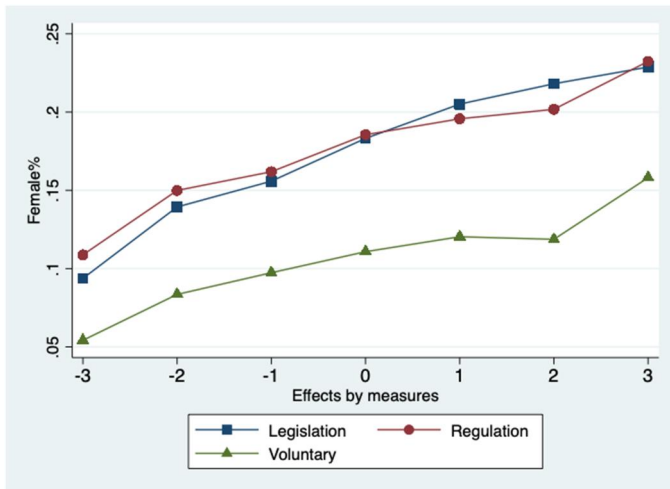
Figure 1. The change in the percentage of women on boards by policy. A line graph illustrating the percentage of women on boards of 3 years before and after the implementation of board gender equality policies. The regulatory approach is the most effective, following legislative quotas and lastly regulatory approaches.
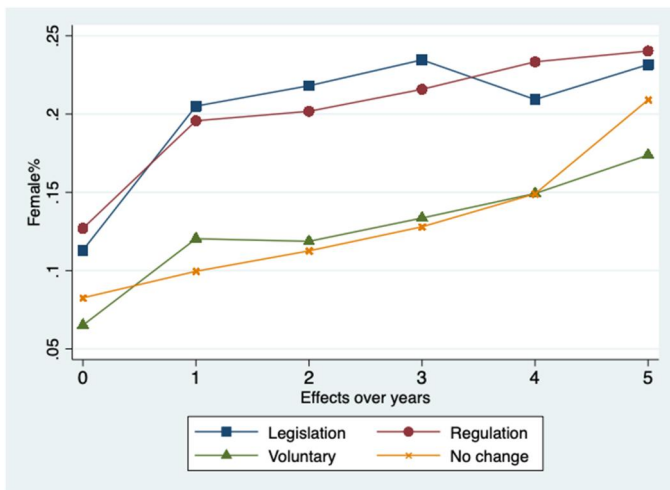

Figure 2. The implementation of policy over time. A line graph illustrating the change in the percentage of women on boards over 5 years after the implementation of policy. Legislative quotas and regulatory approaches outperform voluntary approaches and nations without any policies.

matching firms' characteristics and avoids the excessive dimensioning problems during the matching processes (Mao 2019).

Following Özbuğday et al. (2020), the radius matching method is applied to estimate average effect of soft law on board gender equality. This method can address the concern of poorly matched observations.[1] In other words, this approach allows the usage of extra observations when the good matches are not available. Radius matching uses all the relevant control observations as matching criteria. The propensity score of a matched firm falls into a predetermined level of the propensity score of the

Table 5. Which Policy approach is most effective? Propensity Score Matching (PSM)-Difference-in-Difference (DID) approach.

	(1) Legislation	(2) Regulation	(3) Voluntary
Post	0.007*	0.060***	0.004
	(0.004)	(0.006)	(0.006)
Quota	0.010*		
	(0.005)		
DiD(Quota*Post)	**0.047*****		
	(0.006)		
Principles		−0.045***	
		(0.008)	
DiD(Principles*Post)		**0.047*****	
		(0.009)	
Voluntary			0.009
			(0.007)
DiD(Voluntary*Post)			**0.048*****
			(0.009)
Board size	0.002***	0.001**	0.003***
	(0.001)	(0.001)	(0.001)
Education level	−0.001**	0.001	−0.001
	(0.001)	(0.001)	(0.001)
Independence	0.001**	−0.001	0.001
	(0.001)	(0.001)	(0.001)
Experience	−0.009***	−0.008***	−0.018***
	(0.001)	(0.002)	(0.002)
Operating income	−0.009***	−0.004***	−0.005***
	(0.001)	(0.001)	(0.001)
Firm size	0.011***	0.014***	0.018***
	(0.001)	(0.001)	(0.001)
GDP growth	−0.002***	−0.004***	−0.001
	(0.001)	(0.001)	(0.001)
GDP deflator	−0.007***	0.004***	0.003***
	(0.001)	(0.002)	(0.001)
Labor supply	0.001***	0.007***	0.005***
	(0.001)	(0.001)	(0.001)
Year Effect	Yes	Yes	Yes
Constant	−0.087***	−0.444***	−0.490***
	(0.012)	(0.028)	(0.067)
Observations	19,705	6,771	7,277
Adj. R-squared	0.237	0.265	0.383

Table 5 reports the propensity score matching (PSM)-difference-in-difference (DID) results. The caliper approach is applied in the propensity score matching process, which restricts the matching to a maximum distance between the treated and the matched control samples. Each treated firm is matched to a control firm within the caliper of 0.1. Post is a dummy variable that equals one if it belongs to the post-policy implementation period and zero otherwise. ***, ** and * denotes significance at 1%, 5%, and 10% respectively.

firm in the treated group. Following Brixiová, Kangoye, and Yogo (2020), a maximum propensity score distance of 0.1 is selected.[2] The magnitude of difference in the proportion of female board members between the treatment firms and control firms are derived by estimating the following equation:

$$T_{ATT} = E[Y_{i,t,j}p, \ D = 1] - \ E[Y_{i,t,j}|p, \ D = 0] \tag{1}$$

Where T_{ATT} refers to the average difference between matched treatment and control observations; $Y_{i,t,j}$ refers to the proportion of women on board of firm i at year t in country j; Dummy variable 'D' equals to one if a firm subjects to legislative quota (or regulatory principle or voluntary method), zero otherwise. The propensity score p is calculated based on the probability of subjecting to these 'policy measures' given the firm and country characteristics as defined in Table 4.

Based on the matched treated and control samples, a difference in differences (DID) model is then applied to compare the impact of policy measures on the percentage of women on boards before and after policy implementation. The DID model is designed as follows:

$$WOB_{itj} = \beta_0 + \beta_1\ Treated_{itj} + \beta_2\ Post_t + \beta_3\ (Treated_{itj} \times\ Post_t) + \theta X_{itj} + \omega_t + \varepsilon_{itj} \quad (2)$$

Where WOB_{itj} is the dependent variable, which refers to the percentage of women on board of the firm i in country j in year t. The dummy treated group, $Treated_{itj}$, refer to the specific policy measure (legislative quotas, 'comply or explain' or voluntary approaches) that a firm i subject to in country j in year t. We define a dummy variable '$Post_t$', which equals 1 if the observation is in the post policy-implementation period and 0 otherwise. X_{itj} is a vector of control variables, defined in Table 4. We also control for time effects, which denotes to ω_t. ε_{itj} is the stochastic disturbance term. These estimates are reported in Table 5.

To further assess the effect of policy approaches and dimensions and institutional factors, this is conducted in two stages. First, we compare the percentage of women on boards for the three policy approaches, controlling for firm and country-specific characteristics. We then introduce interaction terms for the enforcement, compliance and implementation dimensions (defined in Table 3).

To justify our baseline model, we estimate a simple OLS regression using the full sample. Then we consider time-series effects and national/state heterogeneity by introducing year and national/state dummy variables. Different panel-robust statistical inferences are considered and indicate the standard errors of the conventional fixed-effect model are relatively small, whilst clustered standard errors are close to those obtained from the bootstrapping method. Heteroskedasticity is detected from the Wald test, so we cluster standard errors at the firm level. Our baseline model employs firm fixed effects and is stated as:

$$WOB_{itj} = \beta_1 Measures_{tj} + \beta_2 Measures_{tj} * Dimensions_{tj} + Controls_{itj} + \epsilon_j + \xi_t + \gamma_{itj} \quad (3)$$

Where WOB_{itj} is the percentage of women on the board of firm i in country j in year t, $Measures_{itj}$ is a dummy variable for the different policy approaches of firm i in country j in year t; $Dimensions_{tj}$ represents the policy dimensions in country j in year t defined in Table 3; $Controls_{itj}$ refers to a set of control variables defined in Table 4; ϵ_j and ξ_t are country and year fixed effects respectively and γ_{itj} is the error term.

This base model is adapted to consider the three dimensions of policy using different sanction metrics. First, a dummy variable is constructed to indicate whether sanctions are imposed for non-compliance (i.e., *Sanction*). Second, as only legislative quotas have more than one sanction whereas 'comply or explain' regulatory framework and voluntary approaches with a maximum of one sanction – disclosure, we only consider how many sanctions exist and their effects on legislative quotas. We label the number of sanctions as *No.sanctions* in the model. Lastly, we consider the effects of a specific sanction (*Refilling, Lawsuits, Fines, Disclosure, Dissolution or Delay pay*) on three measures of soft law. The results are reported in Table 6.

In Table 7, we examine the interaction between specific policy measures and their compliance dates. We do this through considering two measures of compliance date; one, a dummy variable indicating if a compliance date is initiated (i.e., *deadline*), and two, the number of years from the initial year to the compliance year (i.e., *year gap*). In Table 8, we examine if the design of the target influences the effectiveness of the

Table 6. Interaction of sanctions.

	(1)			(2)			(3)	
Quota	−0.023***	(0.005)	Quota	−0.022***	(0.005)	Quota	−0.023***	(0.005)
Principles	0.005	(0.004)	Principles	0.107***	(0.012)	Principles	0.006*	(0.003)
Voluntary	0.012***	(0.003)	Voluntary	0.030***	(0.003)	Voluntary	0.030***	(0.003)
Quota*Sanction	0.140***	(0.012)	Quota* No. sanctions = 1	0.048***	(0.006)	Quota*Disclosure	0.029***	(0.007)
Principles*Sanction	−0.023***	(0.007)	Quota* No. sanctions = 2	−0.138***	(0.009)	Quota*Dissolution	0.072***	(0.017)
Voluntary*Sanction	−0.065***	(0.007)	Quota* No. sanctions = 3	−0.072***	(0.010)	Quota* Fines	−0.081***	(0.007)
Constant	−0.169***	(0.018)	Constant	−0.131***	(0.018)	Quota* Refill	−0.010	(0.008)
						Quota* Delay pay	0.097***	(0.012)
						Quota* Lawsuits	−0.081***	(0.011)
						Constant	−0.177***	(0.018)
Control variables	Yes			Yes			Yes	
Year fixed effects	Yes			Yes			Yes	
Firm fixed effects	Yes			Yes			Yes	
Observations	109,715			109,715			109,715	
Adj. R^2	0.34			0.34			0.34	
F-test	0.000***			0.000***			0.000***	

The table reports the interaction term for sanctions controlled for firm- and country-level characteristics. We consider 1) sanction as a dummy variable 2) the number of sanctions, 3) the six forms of sanction. We use clustered standard error to obtain heteroscedasticity-robust standard errors. Columns 1-3 respectively report the results of the effects of sanction using these three measures. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

Table 7. Results with the interaction term by compliance date.

Independent variables	(1)			(2)	
Quota	0.045***	(0.004)	Quota	0.049***	(0.003)
Principles	0.004	(0.007)	Principles	0.006	(0.006)
Voluntary	0.004	(0.007)	Voluntary	0.006	(0.006)
Quota*Deadline	−0.018***	(0.004)	Quota*year gap = 2	−0.026***	(0.005)
Principles*Deadline	0.009	(0.008)	Quota*year gap = 4	−0.056***	(0.009)
Voluntary*Deadline	0.028***	(0.007)	Quota*year gap = 5	−0.059***	(0.007)
Constant	−0.141***	(0.018)	Quota*year gap = 7	0.022***	(0.008)
			Principles*year gap = 2	0.076***	(0.012)
			Principles*year gap = 3	0.078***	(0.008)
			Principles*year gap = 5	0.09***	(0.008)
			Voluntary*year gap = 3	0.005	(0.007)
			Voluntary*year gap = 10	0.080***	(0.010)
			Constant	−0.114***	(0.018)
Control variables	Yes			Yes	
Year fixed effects	Yes			Yes	
Firm fixed effects	Yes			Yes	
Observations	109,715			109,715	
Adj. R^2	0.33			0.34	
F-test	0.000***			0.000***	

The table reports the interaction between a specific measure and compliance date including 1) dummy variables indicating if a compliance date is initiated and 2) the number of years from the initial year to the compliance year. A clustered standard error is used to obtain heteroscedasticity-robust standard errors. ***, ** and * denote significance at 1%, 5%, and 10%.

Table 8. Results with the interaction term by the third dimension of the target.

	(1)			(2)			(3)	
Quota	0.019***	(0.003)	Quota	0.011***	(0.003)	Quota	0.056***	(0.002)
Principles	0.016***	(0.004)	Principles	−0.012***	(0.004)	Principles	0.022***	(0.004)
Voluntary	0.028***	(0.003)	Voluntary	−0.013***	(0.005)	Voluntary	0.063***	(0.004)
Quota*Ratio	0.026**	(0.011)	Quota*Size	0.124***	(0.012)	Quota*Quota gap	−0.290***	(0.012)
Principles*Ratio	−0.030***	(0.010)	Principles*Size	0.097***	(0.018)	Principles*Quota gap	−0.144***	(0.020)
Constant	−0.129***	(0.020)	Voluntary*Size	0.143***	(0.018)	Voluntary*Quota gap	−0.252***	(0.017)
			Constant	−0.119***	(0.018)	Constant	−0.174***	(0.018)
Control variables	Yes			Yes			Yes	
Year fixed effects	Yes			Yes			Yes	
Firm fixed effects	Yes			Yes			Yes	
Observations	109,715			109,715			109,715	
Adj. R^2	0.33			0.34			0.35	
F-test	0.055*			0.000***			0.000***	

The table reports the results with the consideration of the interactional effects of the target. We focus on three dimensions of the target, 1) a dummy variable indicating the way that the target is phrased, in numbers or in percent, 2) a continuous variable of the magnitude of the target if it is in percent, 3) a continuous variable measures the difference between the target and the precedent gender diversity of a specific firm. The results of three dimensions are reported in column 1-3 respectively. We use a clustered standard error to obtain heteroscedasticity-robust standard errors. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

policy measure, as countries use different compliance targets. We first examine the interaction between specific policy measures and the format of the target by using a dummy variable, *Ratio*, coded one, if the target is set as a percentage and zero when a target is expressed as a minimum number of women on the board. We then examine the effects of the magnitude of target, *Size*, coded one, if the target is in percentage on different measures. Lastly, we examine if the perception of the feasibility of achieving the target affects the effectiveness of a specific measure. We use the proxy of the gap between the target and a firm's precedent gender diversity level, *Quota Gap*, to indicate the feasibility. According to Locke's goal setting theory (Locke and

Table 9. Sub-national and national effects.

Independent variables	(1)		(2)	
Quota	0.014***	(0.002)	0.040***	(0.010)
Principles	−0.008**	(0.003)	0.018	(0.016)
Voluntary	0.010***	(0.003)		
Quota*EU	0.052***	(0.004)		
Principles*EU	0.044***	(0.007)		
Voluntary*EU	0.075***	(0.008)		
Quota *New York			−0.032**	(0.016)
Quota *Washington			−0.065**	(0.026)
Quota *Maryland			−0.032	(0.031)
Quota*California			0.009	(0.015)
Quota*Illinois			−0.077***	(0.030)
Principles *Massachusetts			−0.031	(0.022)
Principles *Pennsylvania			−0.041*	(0.024)
Constant	−0.093***	(0.018)	−0.150***	(0.019)
Control variables	Yes		Yes	
Firm fixed effects	Yes		Yes	
Year fixed effects	Yes		Yes	
Observations	109,715		30,426	
Adj. R^2	0.34		0.32	
F-test	0.000***		0.003***	

The table has two columns. Column (1) reports the results of regional effects on the effectiveness by introducing a dummy indicating whether a firm's headquarter located in EU member states or not. Column (2) reports the results of regional effects on the effectiveness by introducing a dummy indicating whether a firm's headquarter is located in either of four states of U.S., Massachusetts, Pennsylvania, Illinois or California or not. We use a clustered standard error to obtain heteroscedasticity-robust standard errors. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

Latham 1990), we argue that firms are more likely to be demotivated if the gap is perceived too large to achieve.

Lastly, we examine the effects of the European Union and the United States to ascertain if our results vary by national and institutional factors. We first divide our sample into EU (4,802 firms) and non-EU countries (9,211 firms). The results are reported in Table 9 Column (1). We also consider intra-national effects by focusing on the United States, where seven states (Massachusetts, Pennsylvania, Illinois, Washington, Maryland, New York and California) promote gender diversity on boards. The differences between states enable examination of whether a specific measure varies over the United States, whilst holding country-level characteristics constant. This is tested using a subsample of 3,185 U.S. firms including 295 firms in Massachusetts, 181 firms in Pennsylvania, 149 firms from Illinois, 83 firms from Washington, 76 firms from Maryland, 424 firms from New York and 699 firms from California; the results are reported in Table 9 Column (2). Lastly, as U.S. firms are overrepresented, and embody 27.73% of the sample, we exclude these and re-run model (3). The results are available on request.

4. Results

4.1. Descriptive results

Descriptive statistics of the treatment (affected by policy) and control (not effected by policy) groups are reported in Table 4. The average percentage of women on corporate boards is 20% for the treatment group relative to 11% for the control group. Treatment group companies on average are larger in size and less profitable than the control group and have a smaller board size (an average of 9.15 directors, of which

76% are independent). The treatment group also displays a lower GDP growth by 0.11%, a higher GDP deflator by 0.05%, and a lower percentage of women in labor markets by 5.58%.

4.2. Which approach is the most effective in promoting board gender diversity?

In Table 5, we outline which policy approach is most effective using PSM-DID method. Interaction terms indicate that all three policy approaches have significant impact on the percentage of women on boards. In Column (1), Quota*Post is positive at 1% significance, indicating legislative measures effectively promote the presence of female directors after policy implementation. Similarly, in Columns (2) and (3), Principles*Post and Voluntary*Post suggest the significant increase in the percentage of female directors after introducing regulatory and voluntary measures. The results validate our hypothesis 1 that soft law is effective in enhancing board gender equality. As a propensity score matching approach is adopted, t-tests are conducted to determine whether balancing has been achieved. A good balancing is verified that treated and control firms have similar characteristics, as control variables become insignificant and the differences between the treated and control firms converges after matching across different models.[3]

4.3. How do policy dimensions influence policy outcomes?

We consider the influence of sanctions in Table 6. We introduce the dummy variables of *Sanction*, *No. sanctions* and specific sanctions (*Refilling*, *Lawsuits*, *Fines*, *Disclosure*, *Dissolution*, *Delay pay*) and interaction terms with specific policy approaches in the baseline model. In Column (1), we observe the introduction of sanctions strengthens the effectiveness of legislative quotas but has adverse effects on 'comply or explain' and voluntary approaches (coeff = 0.14; −0.023; −0.065; at 1% significance). Legislative quotas are the most effective, when operated with sanction, increasing the presence of female directors by 11.7%. In line with public interest perspectives, legislative quotas largely rely on the interference of the government in response to limited representation of women on boards. This interference is effective as firms comply to avoid negative consequences (McAdams 2000), but we argue, firms might not comply when sanctions are too expensive to afford.

Column (2) presents results on the severity of sanctions (*No. sanctions*) on legislative quotas. Legislative quotas have the maximum of three sanction types but are effective only if one form of sanctions is used (coeff = 0.048, at 1% significance). For two or three sanction types, quotas have adverse effects on board gender equality (coeff = −0.138, −0.072, at 1% significance). To achieve corporate compliance, firms will often seek to minimise their efforts and do only what is necessary, rather than increases their own abilities or to compete with others (Dowson and McInerney 2001; Bipp, Steinmayr, and Spinath 2008). If the costs of compliance outweigh the potential punishments, firms are likely to resist compliance. Therefore as sanctions become more severe, additional effort is required to avoid any negative stimulus and discourage corporate compliance.

Effective policy therefore requires a moderated sanction. To determine the efficacy of individual sanctions we consider all sanction types separately in Column (3). The *delay pay* is the most effective sanction in enhancing board representation of women (coeff = 0.097, at 1% significance), followed by *dissolution* and *disclosure* (coeff = 0.072, 0.029). *Lawsuits* and *fines* are the least effective sanctions and *refillment* has insignificant effects on gender equality.

Table 7 reports the time companies have to comply with a policy target. The results show that a precise compliance date has a positive impact on voluntary approaches, negative on legislative quotas and insignificant on 'comply or explain' approaches (coeff = 0.028; −0.018; 0.009). Quotas are more effective when deadlines are not applied. Compliance dates reduce the effectiveness of quotas by 0.018 (at 1% significance). Voluntary methods are effective only when deadlines are applied, 'comply or explain' principles are ineffective regardless. As the proximity to the deadline date could be more influential than the deadline date itself (Taylor and Shepperd 1998) we consider the length of the transition period using the year difference between the compliance year and the implementation year (*year gap*). The results are reported in Column (2); we observe legislative quotas are the most effective when firms have the longest phase-in period of 7 years (coeff = 0.022, at 1% significance). Similarly, principles and voluntary methods are more effective, with the longest phase-in period of 5 and 10 years, the presence of female directors increases by 9% and 8% respectively (at 1% significance).

In Table 8, we examine different types of targets. We assume that attainable goals need to be perceived as specific, measurable, realistic, and timely (Latham 2003) and require considered formulation (Norcross, Ratzin, and Payne 1989). For example, diversity goals are often quantified in percentage terms to provide clarity and allowing firms to measure their progress (Lunenburg 2011). Column (1) therefore, examines whether percentage or numerical targets of gender diversity are more effective. We report percentage targets enhances board gender equality by 2.6% in the case of quotas (at 5% significance) but have negative effects on principles (coeff = −0.030, at 1% significance). Column (2) reports a percentage target increases by one percent, the policy effectiveness is enhanced by 12.4%, 9.7%, and 14.3% for quotas, principles and voluntary approaches respectively. Nevertheless, we argue if targets distant from the precedent gender diversity levels are perceived unrealistic (Locke and Latham 1984). Evidently, Column (3) reports the larger of the distance, the less effective in promoting gender equality, which of quotas, principles and voluntary approaches reduce by 29%, 14.4% and 25.2% respectively.

4.4. Institutional influences

We report regional institutional influences in Table 9. Column (1) reports the results of regional effects between EU and non-EU countries. Column (2) reports the sub-national effects within the United States. The results in Column (1) display the significance of EU membership for quotas, principles and voluntary methods (coeff = 0.052, 0.044, 0.075, at 1% significance). The results in Column (2) report that intra-national effects exist within the USA, specifically in New York, Washington, Pennsylvania and

Illinois, whereas Maryland, California and Massachusetts with insignificant effects. These states with significant intra-national effects have a negative impact on promoting gender diversity on boards. This might be caused by relatively few states having introduced gender equality policies, and pioneering states facing inertia in promoting gender diversity in the corporate world.

4.5. Robustness check – Tobit regression analysis

The dependent variable is measured by the proportion of female board members, which is subject to limited dependent variable issues. As some firms do not appoint any female members in the board, the dependent variable is a mixture of zero and positive values. We follow Saeed et al. (2019) adopting a Tobit truncated model to address such a concern. A Tobit model is applied to re-estimate the previous PSM-DID results (Table 5), and the results are presented in Table 10. Quota*Post; Principles*Post; Voluntary*Post are reported significant and positive and further confirm our previous inferences, implying that legislative quotas, regulatory and voluntary measures are effective in the promotion of board gender diversity.

5. Policy implications and conclusions

This study conducts a comparative analysis of soft law policy measures used to enhance gender equality on corporate boards. Attaining gender equality on corporate boards is a global policy priority for a multitude of ethical (Terjesen and Sealy 2016), social (Byron and Post 2016), corporate governance (Lara et al. 2017; Nielsen and Huse 2010; Owen and Temesvary 2018) and business reasons (Bennouri et al. 2018; Farrell and Hersch 2005). Despite this conspicuous need for change, it is unclear how different national policies for enhancing gender equality in the boardroom have actually performed (Marquardt and Wiedman 2016; Wiersema and Mors 2016).

In total 99 countries between 2000 and 2021 are considered. We examine three approaches to applying soft law, the dimensions and format of policy and the influence of the institutional context. Our empirical evidence shows that soft law approaches with the least ambiguity and most precision, are the most effective policy measures. This supports the use of public, rule-based approaches for enhancing gender diversity, rather than other less precise soft law approaches. We conclude that while more flexible and less precise soft law approaches are often cheaper to deploy, are easier to agree with participants and to introduce politically, they may also be less effective. Allowing firm choice and limiting sanctions as explicit in soft law approaches may not encourage firms to comply and improve gender diversity on boards. Moving forward it is important for nations to move from less to more precise forms of soft law policies if they wish to enhance gender equality.

The format and dimensions of policy are also influential and alter the effectiveness of policy measures. Legislative quotas are only effective if sanctions are applied moderately, with four forms of sanction or severe sanctions resulting in firms ceasing to comply. Quotas work effectively regardless of the length of the compliance period, implying a gradual rather than immediate effect on women's representation on

Table 10. Results of Tobit regression.

	Model 1 Legislation	Model 2 Regulation	Model 3 Voluntary
Post	0.019***	0.125***	0.009
	(0.006)	(0.006)	(0.010)
Quota	0.027***		
	(0.008)		
Quota*Post	**0.050*****		
	(0.009)		
Principles		−0.073***	
		(0.010)	
Principles*Post		**0.105*****	
		(0.009)	
Voluntary			0.016
			(0.011)
Voluntary*Post			**0.039*****
			(0.012)
Board size	0.005***	0.003***	0.005***
	(0.001)	(0.001)	(0.001)
Education level	−0.001***	0.001***	−0.001
	(0.001)	(0.001)	(0.001)
Independence	0.001***	−0.001***	−0.001
	(0.001)	(0.001)	(0.001)
Experience	−0.014***	−0.012***	−0.032***
	(0.002)	(0.003)	(0.003)
Operating income	−0.014***	−0.009***	−0.013***
	(0.001)	(0.002)	(0.002)
Firm size	0.017***	0.021***	0.031***
	(0.001)	(0.002)	(0.002)
GDP growth	−0.002***	−0.006***	−0.001
	(0.001)	(0.001)	(0.001)
GDP deflator	−0.011***	−0.001	0.004*
	(0.001)	(0.002)	(0.002)
Labor supply	0.002***	0.008***	0.007***
	(0.001)	(0.001)	(0.002)
Year Effect	Yes	Yes	Yes
Constant	−0.283***	−0.541***	−0.886***
	(0.017)	(0.036)	(0.102)
Observations	19,705	6,771	7,277
Left-censored obs.	5,840	1,662	2,878

Table 10 reports the Tobit regression results. Post is a dummy variable that equals one if it belongs to the post-policy implementation period and zero otherwise. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

boards. Generally, firms respond to a policy measure positively when measures have longer compliance periods, and the policy targets are closer to a firm's precedent gender diversity level. Lastly, we report the regional variance in the EU and non-EU countries, and sub-national variance partially existing in the United States. This is an important contribution in light of the debate on regulation of boards in US vs Europe, in particular with regards to ideological differences about the legitimacy of economic power (Dammann 2013; Magnier and Rosenblum 2013; Rubio-Marin 2012; Suk 2012). We suggest future research should examine these institutional differences in the European and USA context.

When implementing gender equality policies, all three approaches are effective but are more effective when applying 'delay pay' and 'dissolution' sanctions, stating the target for women on boards in percentages rather than as a number and ensuring this target is not too distant from firms' current levels of board equality. These policy measures can be successfully delivered through wider political unions such as the EU and less fruitfully applied within federal structures such as those within the USA.

These recommendations pose challenges as unintended reactions to regulation can arise (Reichman 1992). Gender quotas can create ethical tensions (Terjesen and Sealy 2016) resulting in women being promoted more for symbolic reasons rather than their ability (Sealy and Singh 2010). Subsequently, some women do not support quotas, as they "don't want to be a token woman" (Kakabadse et al. 2015). We suggest further investigation of factors affecting how firms promote gender diversity on boards is critical. For instance, we are unaware if firms pre-empt and anticipate changes to policy and the introduction more prescriptive forms of soft law. Further, as the compliance date for many policy measures evaluated in this study is due after 2021, further research as to how firms have strategically engaged with equality policy is critical to evaluate these future deadlines and targets.

Disclosure statement

Notes

1. The other popular approach of matching is the nearest neighbor matching. Nearest neighbor matching means that one control observation is selected as a match for a treatment observation that is closest in terms of propensity score. Nearest neighbor matching method may result in some poorly matched firm-year observations if the closest neighbor is far away (Yang and Mallick, 2010).
2. We have also tried different calipers, including 0.1, 0.05 and 0.01, and the PSM-DID results still hold.
3. In Model 1, the difference between the treated (i.e., firms subject to legislative measures) and control firms is 0.11 and is statistically significant in the unmatched observations. The difference narrows to 0.10 after matching. In Model 2, the difference between the treated (i.e., firms subject to regulatory measures) and control firms is 0.11 and is statistically significant in the unmatched observations. The difference narrows down to 0.07 yet remains statistically significant after matching. In Model 3, the difference between the treated (i.e., firms subject to voluntary measures) and control firms is 0.042 and is statistically significant in the unmatched observations. The difference narrows down to 0.038 yet remains statistically significant after matching.

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