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The board gender diversity imitation game: Uncovering the resistant boards that refuse to play

Ruth Mateos de Cabo [1] | Ricardo Gimeno [2] | Patricia Gabaldón [3] | Pilar Grau [4]

[1]Universidad San Pablo CEU, Madrid, Spain

[2]Banco de España, Madrid, Spain

[3]IE Business School, IE University, Madrid, Spain

[4]Universidad Complutense, Pozuelo de Alarcon, Spain

Correspondence
Ruth Mateos de Cabo, Universidad San Pablo CEU, Julian Romea 23, Madrid 28003, Spain.
Email: matcab@ceu.es

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Abstract

Research question/issue: This study examines the influence of group behavior on board gender diversity and identifies obstacles to its diffusion. It investigates whether boards are influenced by group behavior in determining their gender composition and explores barriers that impede the diffusion process.

Research findings/insights: Analyzing a network of over 18,000 US-listed boards observed over 20 years, we find a pattern of mimetic behavior, whereby boards imitate the proportion of women on boards (WoB) among their directly tied boards. We also identify resistant firms with low representation of women on their boards. Our findings suggest that, among those boards, there are heavily male-dominated boards resisting the appointment of women, even when surrounded by women directors among their tied boards. The diffusion of board gender diversity is slowed down by these resistant boards, hindering the overall progress in increasing gender diversity within the board network.

Theoretical/academic implications: This research contributes insights into group behavior and resistance in board gender diversity. Adopting a network theory lens, our study sheds light on interactions between firms and their connected companies in terms of imitation practices. Drawing on social identity theory, we highlight the significance of the resistance to increasing women's representation exhibited by some boards.

Practitioner/policy implications: Resistant boards, despite group pressure, slow down the diffusion of board gender diversity within the network, leading to overall stagnation. Understanding the sources of resistance allows an exploration of alternative measures to promote diversity without rigid mandates.

KEYWORDS
board networks, corporate governance, diffusion, group behavior, interlocking directorates, women on boards

1 | INTRODUCTION

Nobody is an island, and neither are boards of directors. However, most of the research on women on boards (WoB), when analyzing the factors influencing the proportion of WoB within companies (Gabaldon et al., 2016; Terjesen et al., 2009), has treated research units—be they individuals (e.g., Nekhili & Gatfaoui, 2013; Singh et al., 2008), firms (e.g., Hillman et al., 2007; Mateos de Cabo et al., 2011), or countries (e.g., Carrasco et al., 2015; Clark et al., 2021; Terjesen et al., 2009)—as independent entities, neglecting the interconnectedness among them and the way in which these relationships may influence board composition dynamics. Addressing this critical gap in the WoB literature, the present study aims to examine the potential influence of companies connected by interlocked directorships on the gender composition of boards. Specifically, our focus is on shedding light on the underlying group behavior that perpetuates gender disparities within boardrooms. In the context of this study, "group behavior" is defined as the collective actions or aggregated practices of interlocked boards of directors. By extending this definition beyond the scope of individual actions, we aim to capture the influence of interconnected boards, particularly in their adoption of diversity practices, and the subsequent impact on the gender composition of a specific board. We build on the framework provided by social network theory and social identity theory to guide our study.

The existing body of research on WoB has largely neglected the potential influence of group behavior on individual firms, particularly in relation to board networks. While some studies have studied WoB within the context of board networks, they have focused on the micro level, analyzing the perspectives of individual directors rather than the board level (i.e., the mezzo level). For example, Seierstad and Opsahl (2011) explored the effects of the Norwegian gender quota on women directors' social capital; Hawarden and Marsland (2011) studied the locations of WoB in the New Zealand network; Hodigere and Bilimoria (2015) investigated how professional networks of non-executive directors contribute to new appointments; Strøm (2019) concluded that the Norwegian quota law has driven women to more central positions, replacing many of the traditional male profiles in these networks; Burzynska and Contreras (2020) addressed the increase in the network benefits that women directors experience after the passage of quotas; Grau et al. (2020) found women to have fewer connections than men; Sarabi and Smith (2021) examined busy directors' degree of gender differences in the UK and Norway; and Mateos de Cabo et al. (2022) studied the impact of political and regulatory pressure to increase the influence of women within the European boards of directors' networks. However, these studies have only examined individual directors' centrality measures within the networks and have largely neglected the mezzo level (i.e., the board/firm). Only a few exceptions, such as the works of Gimeno et al. (2022) and Hillman et al. (2007), which will be discussed further in the following section, have suggested that boards may emulate their connected boards regarding their degree of gender diversity. In this paper, we develop a theoretical framework, building on social identity theory and social network theory, to explore the mechanism behind this imitation of board gender diversity and employ an empirical strategy to test the validity of our theory.

Like individuals, firms belong to social networks connected by directors who hold positions on multiple boards, creating a network built on interlocks or network ties (Carpenter & Westphal, 2001; Mizruchi, 1996). Indeed, the prior literature has suggested that ideas, practices, and strategies spread through the individuals who bridge organizations via their networks (Aldrich & Zimmer, 1986). Extensive research has provided evidence supporting the notion that corporate ideas can be diffused through the replication of decision-making processes, specific practices (Westphal et al., 2001), new strategies (e.g., Geletkanycz & Hambrick, 1997; Mizruchi, 1996), and network clusters that facilitate imitation (Greve, 2009, 2011). Accordingly, a substantial and growing body of literature has established that companies are more likely to make strategic decisions if they have directors who are interlocked with other firms that have already implemented such decisions (e.g., Cai & Sevilir, 2012; Diestre et al., 2015; Gulati & Westphal, 1999). Some examples of diffusion among companies include backdating of stock options (Bizjak et al., 2009), tax reduction practices (Brown, 2011), disclosure policies (Cai et al., 2014), and accounting methods (Han et al., 2017). The underlying rationale for this network effect lies in the idea that, through direct contact with companies that have already implemented these policies, the value of these strategies becomes clearer and their adoption is facilitated in the linked firm (Davis, 1991).

Given the substantial evidence on company imitation via interlocks, our study aims to investigate whether the process by which firms decide on the gender composition of their boards of directors (i.e., the degree of board gender diversity) is replicated from their immediate social network (i.e., the companies connected to the firm in the network). Our theoretical framework draws on social network theory and social identity theory for two main reasons. Firstly, social network theory postulates that practices, in our case concerning the degree of gender diversity on boards (i.e., the proportion of WoB), disseminates through social networks and interpersonal communication. Secondly, social identity theory highlights that incumbent individuals in dominant positions within high-status groups, such as men in our context, may not only show preference toward those within their own group but may also actively work to resist the advancement of outgroup members, in this case women directors, to maintain their unique position and status. This tendency of men belonging to the business elite to resist women's advancement to the boards allows us to give sense to different influences and pressures of the agents' social networks (Liu et al., 2017).

Therefore, the primary objective of this study is to analyze the potential influence of group behavior in determining the degree of board gender diversity (i.e., the proportion of WoB) of US companies from 1999 to 2019. Our specification strategy facilitates the exploration of both collective behavior and the conflicting and opposing influences exerted by other firms to increase the proportion of WoB. This study contributes to the existing literature in several ways. Firstly, in the theoretical field, we build on social network theory to argue that the characteristics of a group, specifically the boards that are directly

tied to a particular firm within the board network, influence the proportion of WoB for the individual boards within that group. By employing the model specification strategy proposed by Manski (2000), we provide solid empirical evidence that group behavior has a notable impact on the proportion of WoB, establishing the direction of influence from the group to the individual firm. Moreover, we draw on social identity theory to explain the resistance exhibited by heavily male-dominated boards toward the inclusion of women on their boards, creating heterogeneity in the gender diversity imitation tendency in the network. This sheds light on the importance of resistance to adoption, which can hinder the diffusion of any policy, practice, decision, or strategy. In this way, our study addresses the call by Naumovska, Gaba, et al. (2021) to pay greater attention to diffusion as a source of both homogeneity and heterogeneity across organizations, leading to sustained differences. Finally, our findings have practical implications, informing the design of effective strategies that extend beyond traditional approaches, such as corporate codes of conduct and gender quotas. Our research underscores the need for holistic approaches to address the gender gap in boardrooms, considering the influence of network dynamics and resistance to change. By understanding these dynamics, policymakers and practitioners can develop more nuanced and effective strategies to promote gender diversity in boardrooms.

2 | THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1 | Group behavior within boards' networks

Previous research has supported the idea that a firm's relations to other firms could influence a wide range of behaviors (Granovetter, 1985). One way in which companies establish these relationships is through interlocking directorates, an approach that involves creating a network of interconnected boards that may display similar group behavior (Mizruchi, 1996), disseminating ideas and knowledge among firms (Burt, 1980). Interlocking directorates establish a social network of interconnected boards that collectively exhibit group behavior in their decision-making processes (Mizruchi, 1989; Westphal et al., 2001). This type of networks has been shown to facilitate the imitation of organizational decisions, such as alliance formation (Gulati & Westphal, 1999), poison pills (Davis, 1991), market entries and expansions (Connelly et al., 2011), new organizational forms (Lee & Pennings, 2002), environmental strategies (Lu et al., 2021), or board entrenchment (Benton, 2021).

The interconnectedness of boards within an interorganizational network can result in the influence on one company's board behavior of its connected boards, giving rise to the emergence of group norms and behaviors within the network. Social network theory emphasizes the importance of social networks and relationships, which provide access to resources, information, and opportunities that are not available through formal channels (Shaw, 1998). Within this theoretical framework, connections and informal ties can facilitate the transfer of knowledge, ideas, and practices. Furthermore, social cohesion has been highlighted as a powerful driver of the diffusion of a variety of practices through interlocking directorates within the interorganizational network (Borgatti & Foster, 2003).

In the context of gender diversity on boards, board social networks can play a pivotal role in conveying information on the value of achieving a degree of board gender diversity within companies. At the firm/board level (i.e., the mezzo level), firms can exhibit group behavior in their decisions regarding the appointment of directors and board gender diversity. These network effects of group behaviors may emerge through multiple non-exclusive mechanisms, including the exchange of experience and practices, the sharing of similar norms and values, and access to similar resources and opportunities. To understand this influence better, we specifically consider direct ties within the board network as the potential impact tends to be stronger when companies are closer. Therefore, our focus is on the behavior of companies that directly form the social network of the focal firm within the larger board network.

For the first mechanism, the exchange of experiences and practices through the social network of tied boards may increase the likelihood of imitation of the proportion of WoB. Therefore, companies that are exposed to successful experiences and practices of gender diversity may be more inclined to adopt them. This mechanism becomes particularly significant in the context of WoB given the inconclusive results of the relationship between boards' gender diversity and firms' financial and governance performance (Adams & Ferreira, 2009; Campbell & Mínguez-Vera, 2008; Carter et al., 2010; Farrell & Hersch, 2005; Liu et al., 2014; McGuinness et al., 2015; Nielsen & Huse, 2010; Rose, 2007; Singh & Vinnicombe, 2004). Given the uncertainty surrounding the impact of board gender diversity on firm performance, companies may be more inclined to adopt practices that have been successful for their connected counterparts. Through direct connections in their immediate social network, nomination committees may choose to mimic the strategies and approaches of other firms. The exposure to these successful experiences and practices increases the likelihood of their adoption, allowing companies to align their proportion of WoB with the standards set by other firms in the network.

The second mechanism through which companies can achieve homogeneity in their board gender diversity composition is having similar norms and values. This is because board interlocks create a sense of community among interconnected companies and their directors, who often have similar backgrounds, experiences, and perspectives. Consequently, the norms and values that shape the attitudes of directors toward gender diversity are likely to be similar across connected companies. This alignment of attitudes increases the likelihood of board gender diversity imitation among companies of the same social group. In the current climate, with increasing demands for gender diversity in the boardroom, companies may fear criticism from their stakeholders, activist groups (Eesley et al., 2016), and the media (Jeong & Kim, 2019) if they fail to align with other companies. The pressure to conform to the prevailing standards prompts companies to prioritize gender diversity and avoid being perceived as falling

behind the expectations set by their peers. Failure to meet these expectations could result in reputational risks and scrutiny, which may have adverse consequences for their standing and relationships within their social network.

Finally, companies that belong to the same social group tend to have access to similar resources and opportunities, which influence their hiring decisions and board gender diversity practices. Such resources may include executive search firms, board networks, and professional associations that facilitate the sharing of information and promote gender diversity. Given these shared resources and opportunities, tied companies with interlocking directorates may be more likely to have access to them and, consequently, to be influenced by them in their hiring decisions and board gender diversity practices. Along this line, Hillman et al. (2007) argued that focal companies can choose female directors through their tied firms' boards.

Hillman et al. (2007) asserted that better-networked firms might have improved access to a supply of potential female directors, although they also warned that the nature of their data does not allow them to identify the source of this network effect or its direction. When examining group behavior, it is crucial to acknowledge the inherent challenge of identification, as highlighted by Manski (2000). Specifically, in the investigation of whether group characteristics influence the characteristics of individual actors within the group, drawing statistically valid inferences from standard regression approaches becomes difficult (Manski, 2000). To overcome this identification problem, Manski (2000) proposed various alternatives (i.e., lagged variables, nonlinear model specifications, and instrumental variables). These proposed alternatives will be applied comprehensively in the Methods section to overcome the identification challenge.

In our specific context, the mechanisms give rise to two patterns of group behavior. When a focal firm has a smaller proportion of WoB than the average proportion of its directly interconnected firms (i.e., its immediate social network), it may be motivated to increase the number of women on its board in the future. By contrast, if the focal firm has a larger proportion of women on its board than its connected firms, it may be inclined to decrease the number of women. This behavior stems from the desire to conform to social influences and achieve social homogeneity within their social network. To investigate whether group behavior influences the actions of individual firms, we put forth the following hypothesis:

> **H1.** Boards change (increase or decrease) their proportion of WoB align with the average proportion of WoB of the boards they are tied to.

2.2 | Resistance to change

Despite the rationale presented above, the process of imitation and diffusion is not simple and straightforward as it can encounter several peculiarities and obstacles along the way. Shropshire (2010) theorized that boards might have different degrees of receptivity to the diffusion of practices. The empirical evidence provided by Connelly et al. (2011) supports this notion, demonstrating that tied firms that resist adopting an emerging strategy impede its diffusion. This finding aligns with studies that have shown the heterogeneity of organizational actions, including partial diffusion; adoption followed by abandonment; adoption and modification; and adoption of multiple practices. Several factors contribute to the slow diffusion observed in many cases, such as resistance from organizational members or leadership teams (Jonsson, 2009), evolving discourse about the efficacy of the practice and performance (Greve, 2011), decoupling of the adopted practices, resulting in a gap between adoption and implementation (Fiss & Zajac, 2004), and resistance by third-party opponents, such as interest groups or the media (Naumovska, Zajac, et al., 2021).

Building upon the recognition of these heterogeneities in organizational actions, our second hypothesis focuses on understanding the varying intensity of group behavior's influence on individual board behavior, contingent upon the alignment of the practice being adopted with the board's preferences. The hypothesis finds support in the prior empirical research by Gimeno et al. (2022), which identified asymmetries in the diffusion process of the proportion of WoB. Specifically, they observed that changes in the proportion of women on each board are influenced by the gradient between adjacent boards. Notably, the pace of change in this gradient is slower or faster depending on whether the board has fewer or more women, respectively, than neighboring boards. However, rather than distinguishing between positive and negative gradients—boards with more or fewer women than their peers, following Gimeno et al. (2022)—this work posits that the observed heterogeneity is largely driven by a small subset of heavily male-dominated boards. These boards not only are outliers in terms of their composition but also exhibit substantial resistance to change. This resistance may find its rationale in social identity theory and homophily, suggesting that these boards' inertia is not merely a matter of gradient (a statistical effect) but a reflection of deeper socio-psychological dynamics.

Drawing upon social identity theory (Tajfel & Turner, 1979), it could be argued that certain actors within the board network may resist increasing the representation of WoB because of the idea of homophily. Homophily refers to the tendency of actors to associate with others who share similar demographic characteristics, such as gender (Tajfel & Turner, 1979; Terjesen et al., 2009). Existing board members as incumbents, predominantly men, may be inclined to resist the inclusion of newcomers, women in our case, who are perceived as being part of a different social group. Consequently, this tendency contributes to preserving the homogeneous composition of the board and fortifying the prevailing gender homogeneity within these male-dominated boards (Perrault, 2015).

Furthermore, the tenets of social identity theory suggest that dominant members of a dominant high-status group, such as the male business elite, may not only exhibit a preference for in-group members but also strive to exclude and resist the advancement of out-group members to protect the positive distinctiveness of their position (Dezső et al., 2016). According to Markoczy et al. (2020),

male directors of the business elite may prefer men to women for directorship positions because of identity threat-based career concerns. Given the prevalent male dominance within the business elite, this resistance to appointing women can slow down the progress toward board gender equality. Research has indicated that the selection processes of directors can be heavily influenced by the leadership structure at the highest level of the organization, where individuals often favor known associates to make appointments, thereby restricting the pool of candidates (Withers et al., 2012). Kim and Cannella (2008) and, later, Allemand et al. (2022) showed that social capital can influence the selection of directors and that recruitment practices based on networks can disadvantage women. This is especially true in cases in which men continue to dominate the composition of corporate boards.

The previous arguments are in line with recent research on social network analysis that has examined decision makers as conduits of information who learn and have agency (Tasselli & Kilduff, 2021). This perspective recognizes that each network node, such as corporate boards, possesses its own preferences, motives, and ideologies (Naumovska, Gaba, et al., 2021). Viewing nodes as intricate and politically driven sources of information suggests that firms may selectively withhold information that contradicts their preferred position and make decisions based solely on self-interest. Sanders and Tuschke (2007) argued that the adoption of practices facing significant resistance from influential actors within institutional environments differs from simple transitions between accepted routines. In the context of social network theory, these institutional actors align with the concept of zealots, which closely resembles our context of heavily male-dominated boards. Zealots, initially introduced in the context of modeling voter behavior (Mobilia, 2003; Mobilia & Georgiev, 2005), are characterized by their strong beliefs and their resistance to change or to new ideas that challenge their power or position. Nevertheless, it is important to note that, while zealots are associated with specific ideologies, such as religious or political extremism, heavily male-dominated boards are based on preferences and shared elite privileges. Despite these distinctions, both phenomena have a significant impact on collective social dynamics and should be recognized for their potential influence.

To identify the resistance of heavily male-dominated boards to increasing the representation of women, we focus on those companies facing social pressure from tied companies with a higher proportion of women on their boards. In those cases, since companies have easy access to a pool of female directors through their tied companies in case they want to increase their proportion of WoB, we can rule out the lack of candidates as the cause of their low board gender diversity. Thus, any resistance within this group of companies only could be attributed to the entrenched male directors protecting their privileges and power (Huang et al., 2020).

These arguments lead us to the following hypothesis:

H2. When a (focal) board has a significantly lower proportion of WoB than the average of the directly tied boards the rate of change is slower.

3 | METHODS AND DATA COLLECTION

The board composition data were drawn from the Boardex database. We obtained the names of each of the 66,265 different directors belonging to 17,890 US listed firms for each year from 1999 to 2019 (summing up to 126,396 board-year observations). Although Boardex identifies each director's gender, we had to run a manual search for approximately 10% of the directors whose gender was not identified. As is standard in the WoB literature, we used the conventional gender ascription of names (e.g., John for a man and Jane for a woman) and performed Internet searches when we were in doubt. We found a total of 9,913 women directors (14.96% of the directors in the database). Considering the different board positions and the 20-year period that was analyzed, there were in total 1,012,709 observations for director positions, of which 11.3% were occupied by women. There were 463,731 cases of board interlocks (i.e., the same director on two or more boards). Among these shared directors, 16.1% were women.

Looking at the dynamics of the boards, we observed that changes in their composition were quite frequent, with between 50% and 75% of the boards changing their members each year (Figure 1). Around 10% of those changes resulted in an increase in the number of WoB, while 6% of the changes resulted in a decrease in WoB (Figure 2).

Descriptive statistics and a correlation matrix for all the variables used in the following analyses can be found in Table 1.

3.1 | The diffusion model

The empirical study of network effects presents a major drawback, as highlighted by Manski (2000). This limitation stems from the challenge of determining the direction of causality when observing similarities in the variable of interest among neighboring firms. While confirming that correlation between these observations is feasible, establishing whether group behavior is causing the focal firm's behavior or vice versa is more challenging. This issue is evident in the previous analyses conducted by Gimeno et al. (2022) and Hillman et al. (2007). To address this challenge, Manski (2000) proposed potential solutions that we will incorporate into the design of the proposed model specification.

First, to address the diffusion of the proportion of WoB within a network, we adapted the diffusion model equation originally developed by Joseph Fourier in 1822. This equation is commonly used to model the diffusion of a quantity, such as heat, through a given region. In simple terms, the diffusion equation can be expressed as follows:

$$\frac{\partial w}{\partial t} = \beta \cdot \Lambda w$$

Here, w represents the variable of interest, which in our case is the change in the proportion of WoB. The parameter t denotes time, β represents the diffusivity constant that describes the speed at which w diffuses (higher β values indicating faster diffusion), and Λ is the

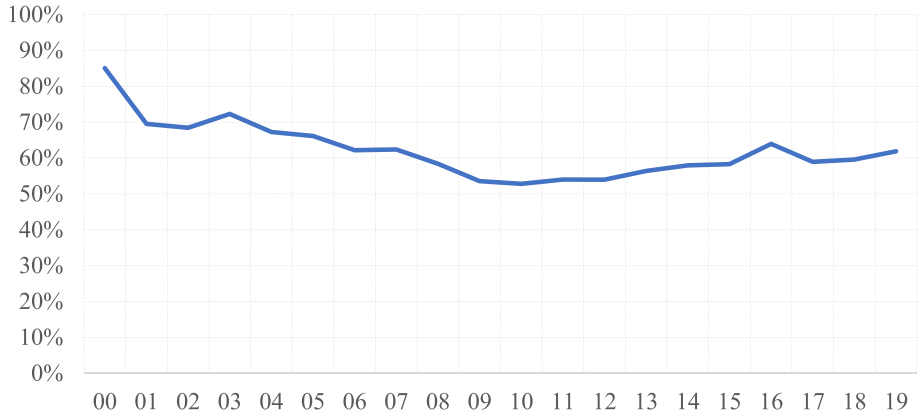

FIGURE 1 Proportion of boards changing their composition each year. [Colour figure can be viewed at wileyonlinelibrary.com]

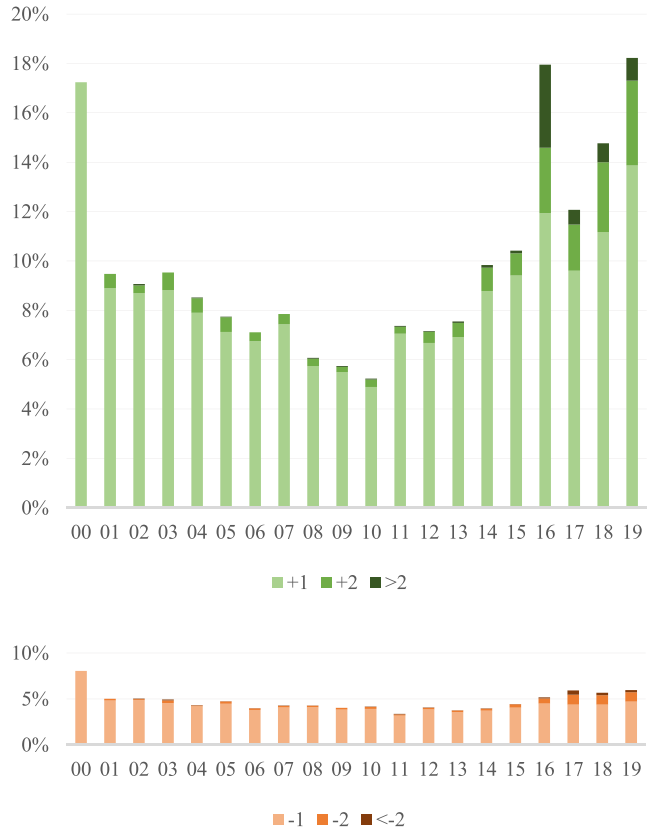

FIGURE 2 Proportion of changes in board composition that implied an increase (top) or decrease (bottom) in the number of women on board. [Colour figure can be viewed at wileyonlinelibrary.com]

Laplacian operator. In the context of our study, Λw could be interpreted as the difference between the proportion of WoB of the focal board and the average value of the proportion of WoB of the tied boards. For simplicity, we call this difference *Gap*. This variable allowed us to capture the influence of group behavior on the diffusion process. Specifically, our proposed model specification can be represented as follows:

$$\Delta W_{it} = \gamma_t + \alpha_i + \beta_{gap} \cdot Gap_{it-1} + \delta \cdot Z_{it-1} + u_{it} \quad (1)$$

where W_{it} is the proportion of WoB for focal board I in year t. Thus, the dependent variable is the annual change in that proportion of board i between year t-1 and year t ($\Delta W_{it} = W_{it} - W_{it-1}$). For some robustness exercises, we also used the annual changes in the number of WoB and the Blau Index, which also measures board gender diversity (i.e., $Blau = 1 - \left(W_{it}^2 + (1 - W_{it})^2\right)$). For all three variables, higher values indicate higher levels of gender diversity on the board. By employing the finite difference approach, we captured the pace of change, represented by the annual change, rather than focusing solely on the level of WoB, providing insights into the dynamics of gender diversity within board compositions.

The main independent variable (i.e., *Gap*) is the difference between the proportion of WoB of focal board i in year t-1 and the average of that proportion for the tied boards within the board network (i.e., j tied firms in the same year t-1): $Gap_{it-1} = W_{it-1} - \frac{1}{d_i}\sum_j W_{jt-1}$. Value d_i is the number of boards tied to focal board i by one degree of separation, so $\frac{1}{d_i}\sum_j W_{jt-1}$ is the average proportion of WoB for the boards tied to the focal one. With this average, we capture the focal board group pressure within the board network.

Thus, in accordance with Hypothesis 1, we predicted that parameter β_{gap} in Equation (1) would have a negative value. This implies that any disparity between the focal board and the boards tied to it, whether positive or negative, was expected to decrease over time. The magnitude of β_{gap} serves as an indicator of the rate at which this gap closes.

To provide a visual representation of how Equation (1) operates for both positive and negative gaps, we present Figure 3. A negative β_{gap} implies that, if the focal board had a higher proportion of women than its tied boards, it would reduce its proportion of WoB in the following year. By contrast, if the board had a lower representation of WoB than its tied boards, it would increase the presence in the following year. The absolute value of β_{gap} determines the pace at which the gap is closed. Thus, a higher absolute value of β_{gap} corresponds to more rapid convergence in board gender diversity between an individual board and its closest social group. This parameter plays a crucial role in quantifying the network pressure that compels individual boards to align their gender diversity with the average diversity of

TABLE 1 Descriptive statistics.

		Mean	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	WoB	.0063	.0577	.6367	.8422	−.1377	−.1348	−.0594	−.2067	−.1952	−.0918	−.1013	−.0424	.0582	.0143	.0410	−.0010
2	# of WoB	.0769	.6525	.5713	.6560	−.0913	−.0872	−.0550	−.0889	−.0767	−.0532	−.0756	−.0262	.1758	.0560	.1120	−.0317
3	Blau index	.0087	.8822	.6595	.0731	−.1681	−.1692	−.0459	−.1935	−.1844	−.0865	−.1436	−.0563	.0728	.0081	.0300	.0011
4	Gap	−.0018	−.1838	−.1229	−.2195	.0509	.9524	.3737	.5768	.5863	.6022	.6370	.4933	.0518	.0882	.1307	−.0191
5	Gap (man)	−.0002	−.1813	−.1187	−.2211	.9505	.0529	.2212	.5784	.5891	.5623	.6290	.4545	.0779	.1020	.1595	−.0415
6	Gap (woman)	−.0013	−.0720	−.0653	−.0525	.3925	.2391	.0325	.2093	.2132	.3893	.1856	.0544	−.0652	−.0021	−.0544	.0369
7	Industry gap	−.0004	−.2875	−.1351	−.2789	.6302	.6320	.2373	.1167	.9648	.4357	.4110	.1337	.1589	.1538	.3567	−.0846
8	National gap	.0000	−.2700	−.1185	−.2653	.6369	.6397	.2417	.9612	.1210	.4380	.4243	.1331	.2049	.2210	.4042	−.1029
9	Gap (extremely positive)	−.0028	−.1223	−.0732	−.1120	.6026	.5641	.3961	.4670	.4681	0.300	.0119	.0136	.0207	.0187	.0167	−.0491
10	Gap (normal)	−.0026	−.1333	−.0987	−.1844	.6446	.6353	.1995	.4527	.4636	.0088	.0323	−.0054	.0423	.0860	.1313	−.0104
11	Gap (extremely negative)	.0036	−.0583	−.0364	−.0771	.4800	.4368	.0615	.1468	.1450	.0099	−.0024	.0250	.0263	.0430	.0722	.0337
12	Board size	1.943	.0464	.2123	.0520	.0558	.0798	−.0647	.1942	.2477	.0220	.0497	.0231	.5609	.3333	.6903	−.2045
13	Level of risk	.5671	−.0016	.0524	−.0090	.0906	.1031	−.0011	.1604	.2319	.0164	.0878	.0483	.3164	.2353	.4602	−.1299
14	Firm size	7.279	.0172	.1076	.0044	.1351	.1631	−.0524	.3695	.4104	.0172	.1306	.0824	.6701	.4584	2.530	−.1434
15	Profitability	1.153	.0053	−.0317	.0092	−.0246	−.0499	.0429	−.1022	−.1234	−.0547	−.0135	.0347	−.2182	−.1419	−.1552	.2087

Diagonals represents the standard deviations, the upper triangle are the correlations for the full sample, while the lower triangle are the correlations for the subsample of the cases with changes in the boards. *WoB* is the proportion of Women on Boards. *# of WoB* is the number of Women on Boards. *Blau Index* is the Blau Index for the proportion of men and WoB. These three variables are in annual changes. All the other variables are lagged one year. *Gap* is the difference between the proportion of WoB for the focal board and the mean proportion of WoB for the tied-to boards. *Gap (man)* is the same difference but only using the tied-to boards sharing a man director. *Gap (woman)* is the same difference but only using the tied-to boards sharing a woman director. *Industry gap* is the difference of the proportion of WoB with the mean proportion of WoB for the same industry in the same year. *Country gap* is the difference of the proportion of WoB with the mean proportion of WoB for the whole sample in the same year. *Gap (normal)* is the difference between the proportion of WoB for the focal board and the mean proportion of WoB of tied-to boards, removing the extreme values. *Gap (extreme negative)* is the same difference, if the value is extremely negative, and 0 otherwise. *Gap (extreme positive)* is the same difference, if the value is extremely positive, and 0 otherwise. *Board size* is the board size number of directors in log). *Level of risk* is the leverage measured as debt over total assets. *Firm size* is the log of total assets. *Profitability* is the return over assets.

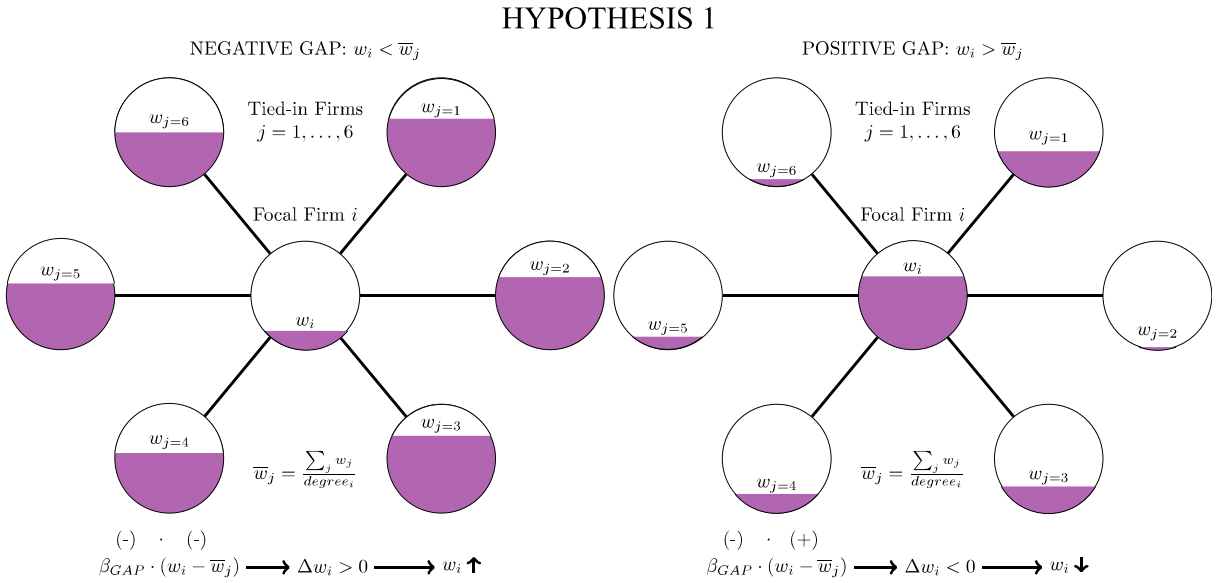

FIGURE 3 Theoretical framework. Connection of the proportion of women on boards (*w*) among firms. [Colour figure can be viewed at wileyonlinelibrary.com]

their closest social network. It encapsulates the influence of social connections and facilitates the assessment of the pace at which boards adapt to the gender diversity norms prevailing within their social network.

This specification addressed several methodological concerns and improved the robustness of our analysis. By considering the gap between the focal board and its immediate social network in year *t*-1 and the change in the proportion of WoB of the focal board in the following year, we eliminated the issue of contemporaneous correlation in the network effect. Following the recommendation of Manski (2000), we focused on explaining the variation in the dependent variable (ΔW_{it}) using lagged gaps instead of contemporaneous variables. This time lag allowed us to establish the direction of influence, specifically from the group pressure to the focal board, in line, for instance, with Benton (2021) for the diffusion of the board entrenchment through the network. This distinction was not possible in previous studies, such as that by Hillman et al. (2007), as their sample only covered a single period.

Another concern that we addressed is the presence of econometric endogeneity resulting from the inclusion of W_{it-1} in the definition of bothΔW_{it} and Gap_{it-1}, which could produce inconsistency in the estimation of β_{gap} (as is the case in Gimeno et al., 2022). To overcome this issue, we adopted an instrumental variables approach. Specifically, we instrumented Gap_{it-1} with Gap_{it-2}=$W_{it-2} - \frac{1}{d_i}\sum_j W_{jt-2}$. This instrument is correlated with Gap_{it-1} but does not include W_{it-1} in its definition. The use of instrumental variables was an additional suggestion by Manski (2000).

The diffusion model in Equation (1) also included time fixed effects (γ_t) to account for business cycles and capture time-specific effects on board gender diversity. Similarly, board fixed effects (α_i) were included to control for firm-specific characteristics that may influence board gender diversity. Notably, these fixed effects were not accounted for in previous studies, such as those by Gimeno et al. (2022) and Hillman et al. (2007). We also included a set of control variables (Z_{it-1}), which is standard in the literature (e.g., Farrell & Hersch, 2005; Mateos de Cabo et al., 2011). These variables include *board size*; *firm size* (measured by total assets); *level of risk* (measured by leverage, which is calculated as debt over total assets); and *profitability* (measured by return on assets). The data on the last three variables were obtained by merging the Boardex database with accounting information obtained from the Compustat database. In all cases, the control variables were also lagged by one year.

To test the second hypothesis, we classified the observations into three distinct groups based on the proportion of women on the focal boards relative to their tied boards (i.e., the independent variable). The first group consists of the focal boards that have a significantly lower proportion of women than their tied boards. This situation indicates the presence of heavily male-dominated boards in which established entrenched relationships may perpetuate gender disparities. We identified this group by *Gap (extreme negative)*, which is equal to *Gap* if the difference between the focal board and its tied boards is extremely negative (i.e., $Gap_{it-1} < -\vartheta$) and zero otherwise. The second group comprises focal boards with proportions of WoB that are relatively similar to those of their connected boards. We identified this group by the variable *Gap (normal)*, which is equal to *Gap* if the difference between the focal board and its tied boards is small (i.e., $-\vartheta \leq Gap_{it-1} \leq \vartheta$) and zero otherwise. Lastly, the third group includes focal boards with a significantly higher proportion of WoB than their tied boards, which we might call gender diversity champions. Once more, we identified this group with the variable *Gap (extreme positive)*, corresponding to *Gap* for extremely positive differences (i.e., $Gap_{it-1} > \vartheta$) and zero otherwise.

We considered two approaches for defining the threshold ϑ. In the first approach, we set a fixed value of $\vartheta = 15\%$, which divides the

observations roughly into groups representing 5%, 90%, and 5% of the total sample. Alternatively, we used a time-varying threshold ϑ_t, which maintains the 5%, 90%, and 5% distribution for each year, allowing for potential variations in the composition of the groups over time.

$$\Delta W_{it} = \gamma_t + \alpha_i + \beta_{en} \cdot Gap\,(extreme\ negative)_{it-1} + \beta_n \cdot Gap\,(normal)_{it-1} + \beta_{ep} \cdot Gap\,(extreme\ positive)_{it-1} + \delta \cdot Z_{it} + u_{it}. \quad (2)$$

Thus, according to the second hypothesis (H2), focal boards that are surrounded by tied boards with a significantly higher proportion of WoB (i.e., heavily male-dominated boards, with $Gap_{it-1} < -\vartheta$) would experience slower convergence to the mean proportion of women on the tied boards than the other two groups. Statistically, H2 implies that $|\beta_{en}| < |\beta_n|$ and $|\beta_{en}| < |\beta_{ep}|$. The introduction of nonlinearities in Equation 2 is also in line with the recommendations by Manski (2000), allowing us to capture the complex dynamics and potential nonlinear relationships in the convergence process.

4 | RESULTS

The estimation results of Equation (1) are displayed in Table 2. Columns 1 and 3 show fixed-effect models, while Columns 2 and 4 present random-effect models. Columns 1 and 2 solely consider the network gap, along with company and year fixed effects, while control variables are added to Columns 3 and 4. Across all the model specifications, β_{gap}, associated with the group behavior influence of H1, is consistently negative and highly statistically significant. This implies that boards imitate the gender diversity proportions that they observe in their immediate social group of tied boards (supporting H1). In the base model of Column 1, the β_{gap} value suggests that the gap in gender diversity between a focal board and the average behavior in its social network closes by one-third each year. The Hausman test indicates that this fixed-effect model is preferred to the random-effect one (Hausman test: 2050.12, p-value = .000). These results were consistently observed for the remaining estimations; thus, from now on, we only report the fixed-effect estimations. Although the inclusion of control variables led to a considerable reduction in the number of observations, the β_{gap} value remained remarkably similar (i.e., −.325 vs. −.253).

Consistent results were obtained when alternative definitions of gender diversity on the board were employed, such as the number of WoB or the Blau Index instead of the WoB proportion. β_{gap} remained negative and statistically significant across all the measures (Table 3).

To address potential concerns that the results may be driven by the gap with other companies in the same country or industry, even if they do not share directors, we conducted additional analyses. In Table 4, we show the results of adding either the gap to the US average or the industry for each year. Despite the correlation between the three gaps (i.e., country gap, industry gap, and network gap), even after accounting for them, the network gap in the proportion of WoB remained significant in explaining the change in its proportion. This indicates that genuine diffusion through tied boards is taking place, suggesting that social pressure originates from the social group.

As a further robustness check to ensure that the change is due to the social pressure of the tied firms, we disaggregated the gap into two variables: one for boards tied through a male director and another for those linked through a female director (Table 5). We observed that the effect is stronger when the link is established through a male director. This result is in line with Benton (2021), who found that female interlocking directors were less influential than male ones. Furthermore, in our case, it indicates that a man may be perceived as more trustworthy regarding the desired proportion of WoB, providing further evidence that the diffusion channel is indeed the link between boards since the features of these links (such as the gender of the director) matter. Importantly, this effect shows that our findings are not an artificial construct.

In a final robustness exercise for H1, we introduced different time lags in Table 6. It is noteworthy that, as the time lag increases, the magnitude of β_{GAP} decreases, indicating a slightly weakened effect. However, it is crucial to highlight that, even with a time lag of four years, β_{GAP} remained highly significant.

4.1 | Resistance to change

The results for the second model (Equation 2) are shown in Table 7. We found that the tendency to narrow the gender gap differs among different board types. Specifically, focal boards surrounded by boards with similar proportions of WoB (i.e., the homogeneous group, identified by $-\vartheta < Gap_{it-1} < \vartheta$) show a coefficient of −.491, while focal boards with a significant higher proportion of WoB than tied firms (i.e., the gender diversity champion boards, marked by $Gap_{it-1} > \vartheta$,) display a coefficient of −.455. Conversely, focal boards with a significant lower proportion of WoB than tied firms (i.e., the heavily male-dominated boards, denoted by $Gap_{it-1} < -\vartheta$) exhibit a considerably smaller coefficient of −.145. This pattern suggests that heavily male-dominated boards resist aligning with broader group trends in the proportion of WoB, underscoring resistance to change compared with the homogeneous group and even the champions.

To establish the statistical significance of the observed difference, we employed an alternative specification that includes heavily male-dominated boards along with the gap for all boards. The results of this analysis confirmed that the difference is indeed statistically significant (Table 8).

To address a potential concern regarding the influence of board changes on our results, we considered whether the observed difference in the heavily male-dominated boards' group could be attributed to the frequency of board replacements. It is plausible that companies with less frequent board turnovers may lag behind in terms of diversity, potentially biasing the coefficient estimate for the heavily male-dominated board group downward. To investigate this possibility, we

TABLE 2 Diffusion model: regression on the change on the proportion of women on boards.

	(1)		(2)		(3)		(4)	
Gap	−0.325	***	−0.095	***	−0.253	***	−0.095	***
	(.008)		(.003)		(.011)		(.005)	
Board size					0.001		0.003	*
					(.002)		(.001)	
Firm size					0.001		0.001	***
					(.001)		(.000)	
Leve lof risk					−0.005		−0.000	
					(.003)		(.002)	
Profitability					−0.000		0.002	†
					(.003)		(.001)	
Year fixed effects	Yes		Yes		Yes		Yes	
Board fixed effects	Yes				Yes			
Board random effects			Yes				Yes	
Number of observations	107,510		107,510		18,700		18,700	
Number of boards	16,289		16,289		1,868		1,868	
F-stat/Wald chi2 test	3589.47	***	1792.33	***	1186.0	***	668.7	***
Resid autocorrelation	0.0094				0.0361			
Hausman test			1124.34	***			297.26	***

Note: Robust Standard errors (clustered by board) in parentheses.
The dependent variable is the annual change in the proportion of women on the board of a company. The explanatory variable *Gap* is the difference between the proportion of women on the board of the company and the mean proportion of women on the board of companies that share a director with that company the previous year. Control variables are the log of *board size*, log of *total assets*, *leverage* measured as debt over total assets, and ROA (return over assets). All dependent variables are lagged one period. All models include time and company fixed effects. Estimation uses the two-stages least-squares estimator, where *Gap* is instrumented using the same variable lagged two period as well as the rest control variables.
$^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$, and $^{\dagger}p < .10$.

estimated the model only for the cases in which there is an actual change in the board composition within a given year. The results of this exercise (Table 8) did not change the outcome, further confirming H2.

5 | DISCUSSION AND CONCLUSIONS

In this paper, we make a significant contribution to the literature on gender diversity in corporate boards by examining the diffusion of the degree of gender diversity among US boards of directors. To date, this area of research has been largely understudied, with existing theories focusing more on the determinants of gender diversity on individual boards, the relationship between gender diversity and performance, and the effects of formal norms, such as quotas and corporate codes, on the levels of WoB. Our study fills this gap by highlighting the influence of group behavior on individual board decisions regarding the proportion of WoB. We find that companies with interlocking directors exhibit a clear mimetic strategy, imitating the average behaviors of their tied firms.

Regarding the diffusion of processes, it is striking that the phenomenon of diffusion of the degree of gender diversity through boards, which has been spreading rapidly in a snowball effect among companies, has not yet received attention from the literature. In this regard, the dissemination of WoB (a continuous, or at least count, variable) has hardly ever receive attention. A drawback of research focused on the diffusion of binary variables (i.e., the adoption or non-adoption of a practice) is that it results in a one-directional determination of the studied strategy. Our study moves beyond this literature as it accounts for diffusion with a continuous variable: the proportion of WoB. Thus, in the diffusion model that we used, the continuous variable can either increase or decrease because of competing pressures, like in consensus models (i.e., gradient descent models). Thus, through the exploration of resistance to these pressures, our study advances the rich research on diffusion by finding differences between the pace of increase and the reduction of gender diversity depending on the social network in which the board is embedded (i.e., its social group). This approximation is related to approaches in which the search aims for a consensus—as in heat diffusion in physics (Castellano et al., 2009)—rather than epidemiology models. This is a relevant contribution in this area since the qualitative difference in the nature of the dependent variable requires a different type of model but also opens up the possibility of using the same methodology as for other previously neglected continuous

TABLE 3 Diffusion model: regression on alternative measures for the change on women on boards.

	Change in the Blau index				Change in the # of WoB			
	(5)		(6)		(7)		(8)	
C	−0.003		−0.005		−0.078	***	−2.016	***
	(.002)		(.011)		(.015)		(.130)	
Gap	−0.459	***	−0.354	***	−2.596	***	−2.298	***
	(.010)		(.014)		(.077)		(.172)	
Board size			0.003				1.157	***
			(.002)				(.029)	
Firm size			0.001				−0.064	***
			(.001)				(.016)	
Leve lof risk			−0.007				−0.078	
			(.005)				(.054)	
Profitability			−0.004				−0.041	
			(.004)				(.049)	
Year fixed effects	Yes		Yes		Yes		Yes	
Board fixed effects	Yes		Yes		Yes		Yes	
Number of observations	107,510		18,318		107,510		18,318	
Number of boards	16,289		1,867		16,289		1,867	
F-stat	4156.1	***	30.33	***	4908.9	***	29.20	***

Note: Robust Standard errors (clustered by board) in parentheses.
For models 5 and 6, the dependent variable is the annual change in the Blau diversity index of the board of a company ($1-\sum p_i^2$, where p_i is the proportion of both women and men on boards). For models 7 and 8, the dependent variables is the change in the number of women on boards. For all models, The explanatory variable *Gap* is the difference between the proportion of women on the board of the company and the mean proportion of women on the board of companies that share a director with that company. Control variables are the *board size* (log of number of directors), *firm size* (log of total assets), *level of risk* measured as debt over total assets, and *profitability* (return over assets). All dependent variables are lagged one period. All models include time and company fixed effects. Estimation uses the two-stages least-squares estimator, where *Gap* is instrumented using the same variable lagged two period as well as the rest control variables.
$^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$, and $^{\dagger}p < 0.10$.

variables (e.g., CEO compensation, firm leverage, and dividend payout ratios).

Our findings also reveal the presence of resistance to change within the context of board gender diversity. In an ideal scenario, the diffusion of gender-balanced boards would lead all companies to the same level of gender diversity (i.e., the average in the proportion of WoB). However, our study uncovers the persistent struggle of companies to maintain male board dominance, even with powerful resisting forces. The evidence from our results supports this resistance, demonstrating that heavily male-dominated boards (i.e., those with a significantly smaller proportion of women on their board than the average of their directly tied firms within the board network, particularly those with a negative gap exceeding 15%) experience a slower pace of increase in their proportion of WoB than other situations. This resistance contributes to the recognition that the diffusion process is not solely a source of homogeneity or consensus but also generates heterogeneity among organizations (Naumovska, Gaba, et al., 2021).

These findings hold significant implications for social network theory. The existing literature has established the positive influence of ties to adopters in the diffusion of strategies or practices. It has suggested that diffusion occurs through an imitation process when directors of firms are exposed to the activities of other firms by sitting on those firms' boards (Davis, 1991; Haunschild, 1993). However, previous research has largely overlooked the potential impact of group behavior on board gender diversity. By adopting a network framework, our study empirically demonstrates the imitation of gender diversity within US boards of directors by studying the influence of contact between actors for the diffusion of practices. Additionally, we recognize the significance of resistance behaviors exhibited by boards that only partially adopt such practices. Connelly et al. (2011) attributed the gap in the literature to the predominant comparison of company diffusion with an epidemiological perspective, which prioritizes links with "infected" individuals while neglecting the potential influence of "healthy" actors. In contrast, our study emphasizes the negative influence that certain actors exert in the diffusion process, leading to resistance and heterogeneity. This interpretation aligns with the concept of network agency proposed by Tasselli and Kilduff (2021), which recognizes politically motivated actors (i.e., nodes) within networks.

TABLE 4 Diffusion model: regression on the change on the proportion of women on boards, with national and industry gaps.

	(9)		(10)		(11)		(12)		(13)		(14)	
C	−0.013	*	−0.019	*	−0.011	***	−0.018	*	−0.013	***		
	(.006)		(.008)		(.001)		(.008)		(.001)			
Gap	−0.066	***	−0.055	**	−0.073	***	−0.067	***	−0.066	***	−0.055	**
	(.010)		(.006)		(.010)		(.019)		(.011)		(0.019)	
National gap	−0.373	***	−0.282	***					−0.246	***	−0.231	***
	(.008)		(.016)						(.017)		(.035)	
Industry gap					−0.369	***	−0.291	***	−0.129	***	−0.052	†
					(.006)		(.016)		(.017)		(.031)	
Board size			0.004	*			0.004	*			0.004	*
			(.002)				(.002)				(.002)	
Firm size			0.002	*			0.002	*			0.002	*
			(.001)				(.001)				(.001)	
Leve lof risk			−0.004				−0.003				−0.004	
			(.003)				(.003)				(.003)	
Profitability			0.002				0.001				0.002	
			(.003)				(.003)				(.003)	
Year fixed effects	Yes		Yes		Yes		Yes		Yes		Yes	
Board fixed effects	Yes		Yes		Yes		Yes		Yes		Yes	
Number of observations	107,510		18,318		107,510		18,318		107,510		18,318	
Number of boards	16,289		1,867		16,289		1,867		16,289		1,867	
F-stat	23935.3	***	3465.9	***	23682.2	***	3378.0	***	24014.5	***	3468.9	***

Note: Robust Standard errors (clustered by board) in parentheses.
The dependent variable is the annual change in the proportion of women on the board of a company. The explanatory variable *Gap* is the difference between the proportion of women on the board of the company and the mean proportion of women on the board of companies that share a director with that company, both lagged one period. *National gap* measures the gap between the proportion of women on the board of the company and the mean proportion of women on the whole country. *Industry gap* measures the gap between the proportion of women on the board of the company and the mean proportion of women on the same industry. All dependent variables are lagged one period. Control variables are the *board size* (log of number of directors), *firm size* (log of total assets), *level of risk* measured as debt over total assets, and *profitability* (return over assets). All dependent variables are lagged one period. All models include time and company fixed effects. Estimation uses the two-stages least-squares estimator, where *Gap* is instrumented using the same variable lagged two period as well as the rest control variables.
$^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$, and $^{\dagger}p < .10$.

In this regard, our study advances the rich research on diffusion by identifying heterogeneity in the US board network's diffusion process of gender diversity, depending on the context in which a board is embedded within the board network (i.e., its immediate social network). The weak pace of increase appears to stem from the presence of a male corporate elite. This influential group displays strong resistance to the inclusion of and sharing of power with female directors, who are often perceived as outsiders within the established power structures. The heavily male-dominated boards' response compared with the reaction of boards in any other context indicates that those nodes (i.e., boards) act as agents of resistance. Social identity theory (Tajfel & Turner, 1979) predicts this behavior as it posits that members of a dominant group, driven by concerns about career and identity threats, tend to favor in-group members while resisting the advancement of out-group members (Dezső et al., 2016; Markoczy et al., 2020). Male directors of the business elite may thus exhibit a preference for male candidates over female candidates for directorship positions, in a homophilic selection process, as male candidates are more trusted given their shared traits and allow them to maintain their position of power and protect the high-status group privileges.

The existence of opposing forces also aligns with the emergent framework of network agency, which posits that nodes in social networks are not passive entities but agents with motives, dispositions, and volition (Tasselli & Kilduff, 2021). In this context, the study by Koskinen and Edling (2012) on peer referral in interlocking directorates provides further support for the operation of homosocial reproduction as a mechanism. Despite an increase in the representation of WoB, women are still not fully integrated into the male-dominated power structures and are not considered equals by their male counterparts.

In addition to its contributions to the literature on gender diversity in corporate boards, this study holds implications for the broader field of corporate governance. Our research aligns with a well-

TABLE 5 Diffusion model: regression on the change on the proportion of women on boards, depending on the gender of the shared directors.

	(15)		(16)	
C	−0.003		−0.001	
	(.002)		(.008)	
Gap (woman)	−0.081	***	−0.064	***
	(.010)		(.012)	
Gap (man)	−0.291	***	−0.218	***
	(.007)		(.010)	
Board size			0.001	
			(.001)	
Firm size			0.001	
			(.001)	
Level of risk			−0.004	
			0.004	
Profitability			0.000	
			(.002)	
Year fixed effects	Yes		Yes	
Board fixed effects	Yes		Yes	
Number of observations	107,510		18,318	
Number of boards	16,289		1,867	
Wald χ^2	3713.3	***	1202.9	***

Note: Robust Standard errors (clustered by board) in parentheses.
The dependent variable is the annual change in the proportion of women on the board of a company. The explanatory variable *Gap (man)* is the difference between the proportion of women on the board of the company and the mean proportion of women on the board of companies that share a male director with that company. Similarly, *Gap (woman)* is the difference between the proportion of women on the board of the company and the mean proportion of women on the board of companies that share a female director with that company. Control variables are the *board size* (log of number of directors), *firm size* (log of total assets), *level of risk* measured as debt over total assets, and *profitability* (return over assets). All dependent variables are lagged one period. All models include time and company fixed effects. Estimation uses the two-stages least-squares estimator, where *Gap* variables are instrumented using the same variable lagged two period as well as the rest control variables.
***$p < .001$, **$p < .01$, *$p < .05$, and $^{\dagger}p < .10$.

established tradition that views governance structures as intricately embedded in a broader social structure (Jones et al., 1997). This provides a social context that allows corporate governance to decide upon the degree to which boards implement gender diversity, which acts as an informal constraint (Boytsun et al., 2011). Specifically, the social group of a firm, including its closest tied companies, acts as an informal institutional driver that influences the behavior of the focal firm (Afzali et al., 2022). Consequently, our findings indicate that neighboring companies have a tangible impact on the extent to which a company embraces gender diversity within its board. Notably, the resistance encountered from heavily male-dominated boards in adopting effective board gender diversity practices acts as a barrier that hinders the diffusion process of female directors' appointments on a broader scale.

5.1 | Practical implications

The present study has important implications for policymakers. Resistance by organizational members or leadership teams in heavily male-dominated boards pushes companies to keep a low proportion of WoB. Although it could be argued that coercive measures, likely coupled with severe punishments (e.g., fines, director appointment cancellations, board seat vacancies, ineligibility for public contracts or subsidies, and naming and shaming), might be needed to counterbalance the refusal of the resistant firms to increase the presence of WoB, it is essential to explore alternative measures that do not rely solely on prescriptive approaches like quota laws. Understanding the source of opposition allows for the exploration of new strategies to change these dynamics.

One potential measure to counterbalance this effect is to encourage the extension of the tenure of WoB to counteract peer pressure toward conformity. Given that reducing the proportion of WoB to average social group values takes an average of two to three years, while increasing it might even take six to 7 years, extending the tenure of women would create more stability and support for gender diversity efforts. Additionally, requiring companies to include a description of their director recruitment procedures in their annual reports could enhance transparency and accountability in board appointments (Allemand et al., 2022). This measure would provide insights into the selection process and help to mitigate biases that may hinder gender diversity. Furthermore, involving successful and prominent men from various fields, such as society, academia, or politics, as "institutional actors" in the gender diversity debate can play a crucial role in driving change (Afzali et al., 2022). These influential figures can leverage their networks and lend their support by promoting gender inclusivity on corporate boards, thereby shaping attitudes and behaviors within the business community.

The implications for companies and their boards are also significant, particularly for those resistant companies with a proportion of WoB that significantly lags behind the average of their social group. It is crucial for these companies to conduct a thorough analysis of the reasons behind this substantial gap and evaluate critically whether it stems from valid economic considerations or is influenced by prejudices or unconscious biases. The decision to increase women's representation on boards is often surrounded by controversy since the benefits of a gender-balanced board are not always easily measured and there are inconclusive findings in the academic literature regarding its impact on firm performance (Galbreath, 2018). In light of these challenges, board members often rely on their social group to inform their decision-making processes. Their deep understanding of board-level issues and their similar levels of discretion in decision making

TABLE 6 Diffusion model: regression on the change on the proportion of women with different lags.

	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
C	−0.003	0.002	0.003	0.001	−0.006	−0.007	−0.007	−0.006
	(.002)	(.002)	(.001)	(.001)	(.012)	(.008)	(.008)	(.009)
Gap (1 year lag)	−0.325***				−0.251***			
	(.008)				(.011)			
Gap (2 years lag)		−0.130***				−0.136***		
		(.003)				(.006)		
Gap (3 years lag)			−0.090***				−0.113***	
			(.003)				(.006)	
Gap (4 years lag)				−0.059***				−0.080***
				(.004)				(.006)
Board size					0.001	0.002	0.002	0.002
					(.002)	(.002)	(.002)	(.002)
Firm size					0.001	0.001	0.001	0.001
					(.001)	(.001)	(.001)	(.001)
Level of risk					−0.005	−0.003	−0.001	−0.002
					(.003)	(.004)	(.003)	(.004)
Profitability					−0.001	0.000	−0.003	0.000
					(.003)	(.002)	(.003)	(.003)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Board fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	107,510	107,510	105,958	104,049	18,318	18,318	17,921	17,426
Number of boards	16,289	16,289	16,289	16,277	1,867	1,867	1,867	1,866
F-stat	3589.5***	117.2***	67.1***	42.67***	1154.1***	32.62***	25.23***	17.06***

Note: Robust Standard errors (clustered by board) in parentheses.
The dependent variable is the annual change in the proportion of women on the board of a company. The explanatory variable *Gap* is the difference between the proportion of women on the board of the company and the mean proportion of women on the board of companies that share a director with that company, with different lags in each model. Control variables are the *board size* (log of number of directors), *firm size* (log of total assets), *level of risk* measured as debt over total assets, and *profitability* (return over assets), all lagged one period. All models include time and company fixed effects. Estimation uses the two-stages least-squares estimator, where *Gap* is instrumented using the same variable lagged one additional period as well as the rest control variables.
***$p < .001$, **$p < .01$, *$p < .05$, and $^{\dagger}p < .10$.

allow them to leverage their networks for guidance (Connelly et al., 2011).

However, given that resistant firms exhibit a slower pace of increasing WoB than other companies, their resistance becomes a significant obstacle impeding the diffusion of gender diversity on boards. Consequently, the issue of low female representation on boards may persist, and relying solely on natural progress over time may prove insufficient to address and rectify this imbalance. Therefore, it is crucial for resistant companies to engage in critical self-reflection, actively identifying the underlying reasons for their low representation of WoB. By understanding the factors contributing to this gap, companies can develop and implement targeted measures and strategies to promote greater gender diversity. Addressing the gender disparity on boards requires proactive efforts from resistant companies to break free from the inertia of the status quo.

5.2 | Limitations and future research

The present study has limitations that simultaneously offer avenues for further research. First, it focused on the largest listed firms, while smaller private companies might also play a role. Future research could explore the interconnection between these large firms and smaller private ones, considering the possibility of stronger herd behaviors and the need for legitimacy among the latter.

Another limitation lies in the assumption that all companies played a similar role, overlooking the emergent framework of network agency (Tasselli & Kilduff, 2021). Exploring organizational factors such as firm size, sector, age, and status, as in Semadeni and Anderson's (2010) research, as well as their network power, reputation, and status (Chandler et al., 2013), could provide valuable

TABLE 7 Asymmetric diffusion model: regression on the change on the proportion of women on boards with asymmetric reaction.

	(25)	(26)	(27)	(28)
C	0.006***	0.009	0.003*	0.002
	(.002)	(.008)	(.002)	(.008)
Gap (extreme negative)	−0.145***	−0.090**	−0.123***	−0.127***
	(.023)	(.030)	(.016)	(.021)
Gap (normal)	−0.498***	−0.396***	0.630***	−0.516***
	(.025)	(.029)	(.033)	(.037)
Gap (extreme positive)	−0.455***	−0.297***	−0.380***	−0.245***
	(.017)	(.022)	(.014)	(0.019)
Board size		−0.002		0.000
		(.002)		(.002)
Firm size		0.001		0.001
		(.001)		(.001)
Level of risk		−0.005		−0.005
		(.003)		(.003)
Profitability		−0.000		−0.001
		(.002)		(.002)
Year fixed effects	Yes	Yes	Yes	Yes
Board fixed effects	Yes	Yes	Yes	Yes
Number of observations	107,510	18,700	107,510	18,700
Number of boards	16,289	1,868	16,289	1,868
F-stat	3424.9***	1064.3***	3803.3***	1236.0***

Note: Robust Standard errors (clustered by board) in parentheses.
The explanatory variable *Gap (normal)* is the difference between the proportion of women on the board of the company and the mean proportion of women on the board of companies that share a director with that company, removing the extreme values. *Gap (extreme negative)* is the same difference, if the value is extremely negative, and 0 otherwise. *Gap (extreme positive)* is the same difference, if the value is extremely positive, and 0 otherwise. In Columns (25) and (26) extreme is defined as <−.15 for the negatives and >.15 for the positives, while in Columns (27) and (28) are defined by quantiles 5 and 95 for each year. Control variables are the *board size* (log of number of directors), *firm size* (log of total assets), *level of risk* measured as debt over total assets, and *profitability* (return over assets). All dependent variables are lagged one period. All models include time and company fixed effects. Estimation uses the two-stages least-squares estimator, where *Gap* and *Gap (extreme positive)* and *Gap (extreme negative)* are instrumented using the same variables lagged two period as well as the rest control variables.
***p < .001, **p < .01, *p < .05, and $^{\dagger}p$ < .10.

insights into the dynamics of gender diversity diffusion. This extension would be in line with Shropshire's (2010) theoretical framework of the factors that change the influence of interlocking directors and the board receptivity. Additionally, this study did not incorporate the potential influence of ongoing and proposed legislation related to board diversity, including rejected mandates (e.g., California's unconstitutional ruling) and ongoing court cases (e.g., Nasdaq focus). This area is ripe for exploration as these regulatory influences are likely to have significant impacts on board composition and diversity practices in companies of all sizes. Lastly, investigating the creation of connections and the influence of the diffusion process on network formation would align with the approach used by Howard et al. (2017).

Finally, there are other directions for future research that are not directly related to these limitations. One interesting inquiry could attempt to capture the richness and complexity of board dynamics and interfirm relations that lead to the gender diversity diffusion process. This can be achieved by conducting extensive interviews with corporate directors to try to understand the process through which the social capital of a firm predicts the organizational behavior in terms of board gender diversity. The long-term network dynamics associated with mimetic processes and opposing forces are also worth investigating. Understanding whether convergence, incomplete diffusion, or a trend-like trajectory of adoption or abandonment emerges would provide a comprehensive understanding of the diffusion process. Lastly, exploring other overlapping networks, such as school connections, club memberships, and public administration connections, could contribute to a more comprehensive understanding of the dynamics at play in gender diversity diffusion (Allemand et al., 2022; Cohen et al., 2008).

TABLE 8 Asymmetric diffusion model: regression on the change on the proportion of women on boards with asymmetric reaction.

	(29) Full sample	(30) Full sample	(31) Any change	(32) Any change
C	−0.002	−0.001	−0.000	0.020
	(.002)	(.008)	(.002)	(.013)
Gap (extreme negative)	0.270***	0.206***	0.400***	−0.289***
	(.028)	(.023)	(.044)	(.058)
Gap	−0.392***	−0.297***	−0.558***	−0.425***
	(.010)	(.013)	(.014)	(.019)
Board size		−0.000		−0.005*
		(.002)		(.003)
Firm size		0.001		0.001
		(.001)		(.001)
Level of risk		0.006		−0.008
		(.003)		(.005)
Profitability		−0.000		−0.001
		(.002)		(.003)
Year fixed effects	Yes	Yes	Yes	Yes
Board fixed effects	Yes	Yes	Yes	Yes
Number of observations	107,510	18,700	63,374	12,126
Number of boards	16,289	1,868	14,286	1,750
F-stat	3763.0***	1223.7***	3835.7***	1171.5***

Note: Robust Standard errors (clustered by board) in parentheses.
The explanatory variable *Gap* is the difference between the proportion of women on the board of the company and the mean proportion of women on the board of companies that share a director with that company. *Gap (extreme negative)* is the same difference, if $Wgap<-0.15$, and 0 otherwise. Control variables are the *board size* (log of number of directors), *firm size* (log of total assets), *level of risk* measured as debt over total assets, and *profitability* (return over assets). All dependent variables are lagged one period. All models include time and company fixed effects. Columns (29) and (30) are estimations of the models with the full available sample. Columns (31) and (32) excludes cases where there is no change in the board. Estimation uses the two-stages least-squares estimator, where *Gap* and *Gap (extreme negative)* are instrumented using the same variable lagged two period as well as the rest control variables.
***$p < .001$, **$p < .01$, *$p < .05$, and $^{\dagger}p < 0.10$.

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CONFLICT OF INTEREST STATEMENT

No conflict of interests exists.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from Boardex. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the author(s) with the permission of Boardex.

ORCID

Ruth Mateos de Cabo https://orcid.org/0000-0003-0946-7996
Ricardo Gimeno https://orcid.org/0000-0002-6687-2149
Patricia Gabaldón https://orcid.org/0000-0002-7443-2661
Pilar Grau https://orcid.org/0000-0003-3917-1096

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AUTHOR BIOGRAPHIES

Ruth Mateos de Cabo Full Professor at the Department of Business Economics at Universidad San Pablo-CEU, earned her highest degree at the same institution. Her research interests lie in Corporate Governance, Women on Boards, and Gender Discrimination. Besides leading the research line on Women Leadership of the USPCEU-Mutua Madrileña Chair, she is well-known for her scholarly publications in prestigious journals and her participations in international congresses. Her work, recognized by various awards, has been featured in leading media outlets. She has also been a Visiting Researcher at several international universities.

Ricardo Gimeno Deputy Head of Operations at Bank of Spain. He has also worked at the European Central Bank and International Monetary Fund. He got his PhD in Universidad Pontificia Comillas (ICADE) where he has been assistant professor as well as in CUNEF, CEU University and New York University in Madrid. His research interests are on Corporate Finance and Governance, as well as Financial Markets and Monetary Policy.

Patricia Gabaldon is the Director of the Bachelor in Economics and Associate Professor of Economic Environment at IE Business School in Madrid (Spain). As an economics professor, she combines theory and practice to understand real life issues, from an applied economic perspective. Her research interests focus on the role of women in the economy, corporate governance, and public policies regarding women on boards and female entrepreneurs. Her research has been published in academic journals such as Corporate Governance: An International Review, British Journal of Management, Journal of Business Ethics and Long Range Planning among others.

Pilar Grau Professor of Applied Economics at the Complutense University in Spain. With expertise in computational finance and network analysis, her research interests encompass a wide range of topics. In the field of finance, she has extensively studied the characteristics of financial time series. Additionally, her work in network science involves analyzing social, financial, and data networks, contributing to a deeper understanding of their structures and dynamics. Her research findings have been published in reputable academic journals.