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Bank board changes in size and composition: Do they matter for investors?

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Abstract

Research Question/Issue: This research seeks to explain whether changes in bank board size and/or composition signal the effectiveness of the board in terms of monitoring and advising.

Research Findings/Insights: Our contribution provides empirical evidence on the negative reaction of investors to board changes, identifies the variables that explain this reaction, and finds that banks with experienced executive directors on their board are candidates to announce increases in board size. Our empirical analysis is based on 608 announcements by banks headquartered in 19 European countries over the period 2003–2015. We apply the Event Studies methodology, Heckman's analysis, system estimator regressions, and probit analysis.

Theoretical/Academic Implications: Our results allow us to conclude that investors perceive changes in board composition as an ineffective response to bank problems, except when the changes increase the number of non-executives. Bank shareholders positively value board changes when the bank has a powerful corporate executive officer and negatively value those banks with high dividends that announce these changes. Banks with higher interest margin and higher executive experience and seniority are more prone to make changes in board size and composition, while those with powerful corporate executive officers, executive directors distracted by their responsibilities on other boards, higher non-executive attrition, where all non-executives are male, with one-tier boards, headquartered in a large country, or those delisting from stock markets will avoid changes in board size.

Practitioner/Policy Implications: This study offers insights to policy makers interested in enhancing banks' corporate governance. Boards should improve the information and transparency of their announcements to signal the effectiveness of board decisions. In addition, it provides insights about the influence of Board Chairs who hold the position of corporate executive officer in the design and effectiveness of banks' corporate governance.

KEYWORDS
corporate governance, bank board size and composition, board announcement, market reaction

1 | INTRODUCTION

Our research seeks to explain whether changes in bank board size and/or composition signal the effectiveness of the board in terms of monitoring and advising. Our contribution lies in providing empirical evidence on the reaction of investors to board changes, in addition to identifying the variables related to the characteristics of the board, director attributes and bank financial characteristics that influence the announcement of bank board changes in terms of composition and size.

Board reforms are justified to enhance stakeholders' (mainly shareholders and regulators) interest amidst the significant scandals in banks' corporate governance over the past two decades. However, relating banks' board changes with stakeholder rights enhancement is no easy task. Therefore, we are motivated to empirically evaluate the market reaction when banks announce changes in the composition and size of their boards and to identify explanations for such reactions. Our paper highlights the negative market reaction to board changes and the causality of such reaction and provides evidence about when a bank will most likely announce changes in its board, contributing to the existing literature on bank boards.

With this aim in mind, we investigate how investors evaluate bank board changes using stock market reactions to announcements, implicitly assuming that market prices incorporate the expected costs and benefits of the announced event. Our paper provides empirical evidence to the debate regarding the relationship between board size or composition and bank performance by (a) quantifying the reaction of shareholders to changes in board size and composition, (b) identifying the most relevant characteristics of directors to explain the observed investor reaction, and (c) finding bank financial variables that contribute to introducing changes in board size and composition.

Our contribution helps to emphasize that while the board of directors is a key mechanism of governance in both financial and non-financial companies, it plays an essential role in banking. Bank boards are crucial to understanding bank governance due to the complexity and opacity of the banking business. Banks' board announcements are signs intending to disentangle such opacity. They play a unique role in balancing the interests of the bank's stakeholders: shareholders, debtholders, and the regulator. Sound bank corporate governance increases monitoring efficiency and quality advising, particularly necessary in troubled times such as a financial crisis.

The financial literature identifies two main roles for bank boards: monitoring and advising. The board's duty is to supervise bank executives so that they make decisions in line with the best interests of shareholders (the principal-agent problem), while also bearing in mind that risk-taking is in consonance with the bank's risk appetite and its long-term stability (the principal-regulator problem). The board's monitoring and advising roles should thus be related to board size and composition. Better alignment of the interests of shareholders, debtholders, and the regulator will provide for a more effective bank board (Mehran & Mollineaux, 2012). Thus, board size and composition should be periodically revised and adjusted to the needs of each bank.

We contribute to the corporate governance literature by testing whether the announcements of changes in board size and composition are related to improvements in board effectiveness for a sample of European banks.[1] If the bank is in trouble, the board becomes even more relevant to provide solutions. In this situation, the expertise and knowledge of directors are key to provide advice and strategic guidance. If the bank's board does not possess such know-how, it needs to appoint new directors or replace ineffective directors with ones having the required expertise and knowledge. Thus, when a board reduces its size, this should be due to the lack of capabilities of the director leaving the board or the existence of redundancies on the board that can only be explained by the entrenchment of the CEO.

Therefore, our contribution analyzes how the announcements in board size and/or composition are explained by the characteristics of its directors: age, experience, education, distraction, gender, nationality, tenure and attrition, and/or how boards function. Anderson et al. (2011) find that investors place valuation premiums on board heterogeneity in complex firms (for instance, banks). However, if a board increases its number of outside members, but the new directors do not contribute to improving board talent or if they are too busy serving on several boards, then a higher proportion of outside members on the bank's board does not help to improve its monitoring or advisory capabilities. Linck et al. (2008) find that boards tend to add independent directors via expansion rather than replacement.

Within this context, we examine the stock market reaction as an indicator of investor expectations regarding the effectiveness of the board in terms of monitoring and advising.[2] Our sample consists of 608 announcements made by 75 European banks between 2003 and 2015. We use the Event Study methodology to compute the market abnormal returns of banks around the time of the announcements of changes in board composition and/or size. Furthermore, we analyze whether the stock market reaction to the announcement is influenced by increases or decreases in size and if it differs depending on whether the changes occur in executive or non-executive directors. However, no other studies have delved into the explanations for such abnormal returns. We subsequently investigate whether these returns may have been driven by other relevant variables using a regression model. Finally, we use a probit analysis to investigate the characteristics of the board that may influence the decision to change.

We find that investors react negatively and significantly to announcements that modify bank boards on the days around the event. However, increasing the size of the board with more non-executive directors generates positive abnormal returns in the post-event and short windows around the announcement. Thus, investors consider that additional non-executives may improve board capabilities for monitoring and advising. However, investors show confidence in announcements when the bank has a powerful CEO who is also the chairman of the board and in banks with higher seniority executives, but penalize those banks whose announcements include a large increase in the number of directors over the current

board size or with boards with all non-executives of the same nationality. Banks with high dividends show lower abnormal returns. Furthermore, banks with experienced senior executives and high interest margins are more likely to announce changes in their board size. On the other hand, banks having one-tier boards, that are headquartered in a large country or that are in trouble, with powerful corporate executive officers, executive directors distracted by sitting on several boards at the same time, high non-executive attrition, and where all non-executives are male are less likely to announce changes in board size.

The next section introduces a literature review of bank board characteristics, directors' attributes and board functioning and how all these characteristics are reflected in the banks' financial statements. Section 3 then introduces the methodology, Section 4 describes the data sources and the variables, and Section 5 presents our results. Robustness checks are performed in Section 6, and finally, the paper ends with our concluding remarks.

2 | LITERATURE REVIEW

To date, the empirical evidence is not conclusive regarding the effectiveness of bank boards (see Vallelado & García-Olalla, 2018, for a survey). These inconclusive results suggest that improving corporate governance requires something other than just increasing the proportion of outside board members. Our review includes a discussion about the relevance of board size and composition, how the characteristics and diversity of boards affect decision-making, and the analysis of board functioning as a result of directors' commitment.

2.1 | Board size and composition

Board size and composition are complementary characteristics in bank corporate governance. Monitoring and advising functions require an adequate number of members to fulfill the task, as well as an adequate combination of expertise and information between external (non-executive or independent) and internal (executive) members. The literature has argued that external board members improve board monitoring and advisory capabilities and play a key role in reducing agency conflicts (Dahya & McConnell, 2007), whereas internal board members bring to the board both their inside information and their expertise (Fernandes et al., 2018). However, Li et al. (2020) have found that board changes are sometimes unnecessary, while Hu et al. (2020) are skeptical about the capabilities of outsider directors to mitigate agency problems. Therefore, complex firms, such as banks, need a large enough board not only to have sufficient resources for monitoring and advising, but also to find the appropriate combination of internal and external board members to enrich discussion and offer different points of view within the board.

More board members mean that the board has more people to monitor and supervise executives. According to White et al. (2014), the reasons for appointing a new board member include the following: overseeing current management by serving on key committees, providing expertise by performing an advisory role, improving the company's social network, accessing external resources or obtaining knowledge transfer, and/or enhancing the firm's reputation. At the same time, however, the larger the board, the higher the agency costs: the free-rider problem, coordination problems within the board, and board costs (Dalton et al., 1999). The empirical evidence shows that excessively large boards do not work in the best interests of shareholders because of the free-rider problem, resulting in a loss of value for shareholders (Mehran et al., 2011). Thus, banks that have seen an increase in the size of their board should consider smaller boards because they are easier to manage and coordinate, they are less expensive, and their members can more easily interact with one another, thereby fostering enhanced cohesion in their decision-making. In other words, overly large boards result in noise and a waste of resources.

Hauser (2018) reports that reductions in board appointments are associated with higher profitability, a higher market-to-book ratio, and the likelihood of directors joining board committees. The conclusion is that board appointments are important for the functioning of the board, but having more directors is not always better. Finally, in such a heavily regulated industry such as banking, the timing of new appointments could be driven by external variables. For instance, Bereskin and Smith (2014) argue that director turnover occurs primarily before elections.

Thus, there is a trade-off in board size. Each bank should identify the optimal size for its board that provides efficient supervision and quality advising while avoiding the inconvenience of large, sclerotic boards (Vallelado & García-Olalla, 2018). One might accordingly wonder why the board has appointed or fired a director and whether the market reacts to new appointees. Changes in bank boards are quite important, as each bank board is the reflection of the unique background and personalities of its top executives. Empirical studies show that appropriate board composition and structure can increase board effectiveness (Fernandes et al., 2018). Moreover, recent research concludes that board characteristics and diversity may improve firm performance and bank stability (Arnaboldi et al., 2019; Fernandes et al., 2016; Karkowska & Acedanski, 2019). This could be the reason why the relationship between board size and performance is not the same for all banks. Some authors find a positive relationship (Adams & Mehran, 2012), and others conclude that there is a negative relationship (Battaglia & Gallo, 2017; Pathan, 2009; Pathan & Faff, 2013; Wang et al., 2012), while there are even others for whom the relationship has an inverted U-shape (Andrés and de Andres & Vallelado, 2008; Grove et al., 2011). Finally, there are authors that do not find any significant relationship at all (Berger et al., 2016).

How to measure board effectiveness is the subject of debate in the corporate governance literature. Effective boards mitigate the risk of bank misconduct and reinforce ongoing regulatory initiatives focused on the role of bank boards in preventing misconduct. Cornelli et al. (2013) show that boards collect either verifiable or

non-verifiable information about the firm's operations, with the latter playing a large role in monitoring. Then, changes in board composition and/or size could be the result of the board's effectiveness in monitoring and advising because they execute such changes analyzing all information, not only the verifiable information. Furthermore, board composition determines the correlation of directors' biases in board governance (Ljungqvist & Raff, 2020). Our argument is that changes in board composition and/or size could be considered signs about the non-verifiable information available to board members that help to understand the board's black box and, so, board governance matters, particularly in banking. We hypothesize that board announcements are the signs by which to observe such governance.

2.2 | Directors' attributes

The upper echelons theory, set out in Hambrick and Mason (1984) and Hambrick (2007), suggests that the individual characteristics of directors matter because the selection of board members with the right characteristics will have an impact on board effectiveness (Mateus et al., 2020). Individual differences are more salient when decision-making situations are complex and ambiguous, as is the case for banks. For instance, good governance prescriptions for banks are different from such recommendations for non-financial firms (John et al., 2016). Banks are regulated, complex and more highly leveraged than non-financial firms and hence generally have larger boards (Adams & Mehran, 2003; Andrés and de Andres & Vallelado, 2008).

Age, education, and work experience are proxies for director experience, skills, and competence. Berger et al. (2014) find that a decrease in average board age strongly increases bank portfolio risk. They also find that an increase in board gender diversity increases risk and that the presence of executives with a PhD degree is associated with a decrease in portfolio risk. However, not all is good news with regard to heterogeneity among directors. The findings of Knyazeva et al. (2013) indicate that the cost of coordinating the board can outweigh the benefits of increased director heterogeneity at high levels of board heterogeneity. Fan et al. (2021) find that hiring non-executives of the same age as the CEO weakens the intensity of board monitoring.

Bernile et al. (2018) likewise examine the effects of diversity on the board of directors on corporate policies and risk. These authors use a measure based on six dimensions, including both demographic and cognitive factors that are observable and widely available. These include gender, age, ethnicity, educational background, financial expertise, and breadth of board experience. They conclude that greater board diversity leads to lower volatility and better performance. The lower risk levels are largely due to diverse boards adopting more persistent and less risky financial policies. Furthermore, firms with greater board diversity also invest persistently more in research and development and have more efficient innovation processes. In the same vein, Ben-Amar et al. (2013) argue that governance regulation should encourage a balance between board diversity and cohesion for the firm's best interest. These authors conclude that board diversity does not have a clear effect on performance. Baselga-Pascual et al. (2018) examine the association between board characteristics and the ethical reputation of financial institutions. They find ethical reputation to be positively associated with board size, gender diversity, and CEO duality, but negatively related to the busyness of board directors and a composite index reflecting poor monitoring. Demographic diversity is another dimension to measure board diversity. Estélyi and Nisar (2016) find that directors' geographical diversity improves a firm's operating performance. However, board demographic diversity is related to communication and integration problems (Ben-Amar et al., 2013; Milliken & Martins, 1996) when such diversity originates cultural, legal, and language conflicts that affect decision-making. For instance, Griffin et al. (2017) find that individualism is associated with directors from Anglo Saxon countries, which could create conflicts when they integrate in boards with a civil law tradition where individualism is less appreciated. Those problems are more difficult to solve in highly uncertain contexts such as those that banks have to face.

Nguyen et al. (2015) find that shareholder market returns are higher when the board appointee is older, has prior experience as an executive director, or holds an Ivy League degree. In contrast, the appointment of an executive who holds multiple non-executive directorships results in negative returns. In addition, gender and experience in non-banking industries do not affect stock market returns around the time of the announcement of a new executive. Wealth effects are enhanced when the appointee joins as CEO. Along the same lines, King et al. (2016) show that educational background conditions firm investment and general decision-making. However, not all forms of education produce a homogenous effect on firm performance, because of selection effects. Nonetheless, ageing directors do not have the same energy nor are they able to make the same efforts as younger directors, who assume their recently acquired role as a board member with the need to create their reputation from scratch. In the same vein, Mateus et al. (2020) observe that new executives tend to be younger and better connected, although they find that after the 2008 financial crisis, new directors in U.K.-listed financial firms are older and better educated.

Education (expertise) and experience are characteristics that help understand whether boards are fulfilling their duties. CEOs may not always possess the knowledge and skills required to make decisions that lower cases of wrongdoing. Thus, CEOs may be prone to missteps in the absence of technical expertise. Additional outside board members should thus bring expertise to their new position, particularly in turbulent times. Minton et al. (2014) find that financial expertise is weakly associated with better performance before the 2007–2008 financial crisis, but is strongly related to lower performance during the crisis. Financial experts that join bank boards should be aware of the explicit and implicit government guarantees given to banks and may encourage managers to pursue risk-taking activities to increase the residual claims of the bank's shareholders (Acharya et al., 2009; Merton, 1977).

Bank CEOs with higher MBA Education factor scores exhibit better firm performance (King et al., 2016). In general, CEOs with higher MBA Education factor scores who follow riskier or innovative business models achieve significantly higher levels of bank profitability. Furthermore, education moderates the responsiveness of CEOs to incentives embedded in their compensation contracts. CEOs with higher Management Education factor scores are more likely to improve bank performance in response to higher risk-taking incentives and receiving a higher fraction of equity compensation.

The inclusion of women on boards has received strong interest from the research community as well as the policy community. Although there is a large body of research on the gender composition of boards, the literature does not provide a clear answer to the question of what effects can be expected from a more gender-balanced board composition (Kirsch, 2018). The evidence of many studies examining the effect on the firm financial performance of boards with a greater proportion of women is inconclusive, finding positive, negative, or no results (Boutchkova et al., 2021; Campbell & Mínguez-Vera, 2008; Chapple & Humphrey, 2014). Some studies have investigated the impact of gender diversity on bank performance with similar results (Arnaboldi et al., 2019; Adams & Ferreira, 2009; Bennouri et al., 2018; García-Meca et al., 2015; Nguyen et al., 2015).

2.3 | Board functioning

A key figure in the board is the chief executive officer (CEO). New directors on the board can significantly influence the board's subsequent evaluation of the CEO. CEOs are usually concerned that new directors may not appreciate their capabilities and will accordingly favor new directors who will be supportive of their leadership. Shivdasani and Yermack (1999) find evidence that CEO involvement in an independent director's selection reduces stock market reaction to the new appointee.

Thus, misconduct is a potential outcome if the CEO has too much authority within the bank. Board independence can be undermined if CEOs exert intangible influence over other board directors (Nguyen et al., 2015). For instance, a CEO with too much power favors the appointment of new directors who have a similar narcissistic tendency or who have been working on other boards with similarly narcissistic CEOs (Zhu & Chen, 2015). We consider that the fact of the CEO also being the chairman of the board affords too much power to this person, because CEO power is positively associated with the appointment of new directors. We argue that new directors favored by CEOs are supportive of CEO decision-making and risk-taking spending.

CEOs have a greater influence over director selection decisions when they have long tenures and greater ownership of the firm. A powerful CEO is able to reduce the frequency of nomination committee meetings and increase the frequency of other board meetings.

According to the similarity-attraction literature, a powerful CEO should favor interactions with a like-minded person as a way of reinforcing their opinions, values and beliefs. The new director's prior experience is a sign to evaluate the director's social acceptability on the new board by the CEO. Independent board control over major managerial decisions is accordingly not substantially improved, even though board independence improves significantly in terms of the representation of outside directors. It is not just a question of size and/or composition, but also of turnover.

Those directors that sit on other boards can be considered highly connected, but at the same time, they have to split their capabilities among several boards, thereby reducing their focus on a particular bank and increasing the risk of being distracted. Well-connected directors can access better information and can hence be better advisors. However, well-connected directors may be constrained for time due to being busy directors (see Fernandes et al., 2018, for a survey). Nguyen et al. (2015) find that the age and busyness of new appointees produce a positive and significant market reaction in the banks included in their sample. Masulis and Mobbs (2014) argue that directors who sit on various boards, that is, busy directors, are more attentive and allocate a higher proportion of their time and effort to those boards that are more prestigious or more visible.

Board turnover may be associated with the end of the board's mandate, incentives to remain on the board or the need to deal with bank difficulties. Fiordelisi and Ricci (2014) argue that to be considered a valuable corporate governance mechanism, a change in directors must be credible in the sense that turnover is negatively related to bank performance. Borokhovich et al. (2014) study unexpected executive and board chair turnover to provide the first evidence on the incentives of grey directors. Bereskin and Smith (2014) conclude that most of the turnover of inside directors occurs via resignation, although the turnover of independent directors largely occurs when they fail to be re-nominated.

However, a bank decision to appoint or reduce directors could also be driven by endogenous factors. Thus, when a bank is not meeting profit expectations, it has to modify its dividend policy and/or assume high risk levels, in addition to facing shareholder pressure to improve performance (Berger et al., 2016; Fee et al., 2013).

There is ample evidence that there were failures in the role of bank boards during the banking crisis (see Fernandes et al., 2018, for a survey). Codes of good governance were already in place during the financial crisis; however, those institutions that complied with the standards of those codes suffered the consequences of the crisis at least with the same intensity as those institutions who did not adopt the recommendations of the codes (Armour et al., 2016). Nevertheless, we should consider that the proposals regarding bank corporate governance were discretional before the crisis, while some are now mandatory. Thus, Globally Systemically Important Banks (G-SIB), as identified by the FSB, have been subject to reinforced supervision due to their nature as being "too big to fail." In addition, large countries, rather than smaller countries, must supervise banks that tend to be larger and operating in

international markets. A special case is that of Eastern European countries that have to accelerate their transformation into a market economy. To complicate matters, we have to consider the co-existence of one-tier boards with two-tier boards, where the roles of executive directors and non-executive directors are split between the two boards.

3 | METHODOLOGY

The empirical analysis considers three different techniques: an event study to identify market reactions to changes in size and composition of bank boards; a regression analysis, including Heckman's analysis, to calibrate the variables that explain the abnormal returns found in the event study; and a probit analysis to study how the characteristics of the board of directors determine the likelihood of announcements about changes in the size and composition of the bank's board.

3.1 | Event study

Our first analysis is an event study to analyze the stock market reactions to announcements of board changes. In order to determine the impact of these announcements, we estimate the market model for each bank's returns related to the return of a stock index in the country where the bank is listed[3] (García-Olalla & Luna, 2020; Moenninghoff et al., 2015).[4]

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad t = \text{-}240, \ldots, \text{-}21 \tag{1}$$

Equation 1 represents the "Market Model" that estimates each bank's return compared with the market portfolio return represented by the market index used as a benchmark. The sequence that we have developed for the event study is the following:

$$E(R_{it}) = \alpha_i + \beta_i E(R_{mt}) \tag{2}$$

where R_{it} is the return of the bank *i* on day *t*. R_{mt} is the return on a representative market portfolio, α and β are the model parameters, and ε_{it} is the error term, with $E(\varepsilon_{it}) = 0$. $E(R_{it})$ is the expected return that the model estimates for a certain firm on a certain date based on the market model.

Then, we calculate the abnormal returns (AR) as established in Equation 3, which are assumed to reflect the stock market's reaction to the arrival of new information. The abnormal return is the actual return of the security (R_{it}*) minus the normal return ($E(R_{it})$). This normal return is defined as the expected return being conditioned by the event taking place. Positive values of AR imply that the stock prices "abnormally" increase following the event, and negative values indicate that the stock prices decrease. Next, we compute the average abnormal return (AAR) across all the N banks from our sample (Equation 4).

$$AR_{it} = R_{it} * \text{-}E(R_{it}) \tag{3}$$

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \tag{4}$$

With the aim of assessing the price reaction over a longer period, we add all the AR over an event window (t_1, t_2) around the event date in order to get the cumulative abnormal return (CAR). Lastly, the average abnormal return across the event window is aggregated (CAAR).

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \tag{5}$$

$$CAAR_t(t_1, t_2) = \frac{1}{N}\sum_{t=t_1}^{t_2} AAR_i \tag{6}$$

The event date is when the announcement was made public. If the announcement was made over the weekend, the event date is the nearest working date. The model was estimated from the daily returns calculated on the basis of the closing prices of each security and each index listed on the Thomson Eikon Datastream database over a period of 240 trading days, ending 20 days before the date of the announcement so as to avoid the influence of confounding events.

We estimate the cumulative abnormal returns (CAR) over different event windows around the event date ($t = 0$). Following other papers on the subject (McWilliams & Siegel, 1997; Nguyen et al., 2015), we consider that investors require time to accurately evaluate the announcement's impact on bank performance. In this respect, we have chosen event windows of different lengths: short enough to avoid the problems of overlapping events, but long enough to capture the effect of the analyzed event. The longest event window ranges from 20 days before to 20 days after the event date, while the shortest covers 3 days (the day before to the day after). In this case, we analyze the $(-5, 0)$ window with the aim of capturing the market's possible anticipation of the announcement and also include the post-event reaction in the $(0, +5)$ window. In addition, we report evidence on the window from 3 days before to 3 days after the event date.

We subsequently calculate the cumulative average abnormal returns (CAAR) as the mean of our estimates for each of the windows. The statistical significance of the CAAR was verified by means of the *T* test, Patell's *Z* test (Patell, 1976), and the standardized cross-sectional test developed by Boehmer et al. (1991).

We perform the event analysis for two samples. The first sample includes those events in which only the composition of the board changes, the board size remaining unaltered. The second sample includes those announcements that generate a change in board size. Regarding changes in size, the announcements are divided into increases and decreases. Moreover, we distinguish between changes in executive directors (ED) and in non-executive directors (NED).

TABLE 1 List of market indices by country

Country	Market index
Austria	ATX
Belgium	BEL-20 INSTITUTIONAL
Cyprus	CYPMAPM
Czech Republic	CZPXIDX
Denmark	OMX Copenhagen
Finland	OMX HELSINKI
France	SBF120
Germany	DAX
Greece	ATHEX COMPOSITE
Italy	FTSE MIB
Netherlands	AEX ALL SHARE
Norway	OBX
Poland	WIG 20
Portugal	PSIALLSHARE
Republic Of Ireland	ISEQ OVERALL
Russian Federation	RTS
Spain	IBEX 35
Sweden	OMX Stockholm 30
Switzerland	SMI
United Kingdom	FTSE ALLSHARES

3.2 | Regression analysis

We run a regression analysis in which the CAR over the long window is the variable to explain, while board size and composition, the characteristics of the board directors, how the board functions and the bank level covariates constitute the independent variables. There are also control variables to account for G-SIB, the 2007–2008 financial crisis, Eastern European countries, one/two-tier boards, large/small countries, and banks delisted during the sample period. We build a panel data set from bank announcements in the period 2003–2015. The panel includes information on the characteristics and composition of bank boards for each of these years if the banks either made announcements about changes in their composition while maintaining their size, or if such changes in their composition also affected their size.

We combine time-series with cross-sectional information to build up an unbalanced panel data set. The main advantage of the panel data methodology is that it allows us to overcome the unobservable and constant heterogeneity of each firm: competitive advantages and strategies, management quality and style, and so forth (Himmelberg et al., 1999). Moreover, panel data contain more informative contents, higher variability, less collinearity between variables, and higher efficiency. Arellano and Bover (1990) argue that panel data analysis allows assessment of the dynamicity of the adjustments and is better in identifying and measuring those effects which are not observable via either cross-sectional analysis or time-series analysis.

As our analysis uses a panel data set in which it is common to use "intact" observations—in our case announcements—this form of selection has the same effect on structural estimates as self-selection: fitted regression functions confound the behavioral parameters of interest with parameters of the function determining the probability of entrance into the sample (Heckman, 1979). For this reason, we perform a Heckman analysis to take into account the bias selection issue, because we select only banks with announcements in one or several of the years of the study for the sample. Second, we carry out a regression analysis with fixed effects and finally perform a regression analysis using the system estimator developed by Arellano and Bond (1991).

To control for the bias in our results originating from the use of a non-randomly selected sample, we use Heckman's proposal to estimate the variables which, when omitted from a regression analysis, give rise to the specification error (Heckman, 1979). The estimated values of the omitted variables can be used as regressors; hence, it is possible to estimate the behavioral functions of interest by simple methods. To solve the selection bias problem, we use two variables: the distance of the bank's headquarters to the nearest airport (Ln of the distance in km) and the number of inhabitants of the city where the bank's headquarters are located (Ln of the city's inhabitants). These variables are chosen because they constitute sources of exogenous variation in their measures of board monitoring and advice. Banks in remote locations will see higher rates of director turnover and will struggle to recruit directors with high advisory capability.

As our sample is a panel, we face the common problem of unobservable heterogeneity due to the combination of time-series and cross-sectional values, as well as the issue of simultaneity, given that some of the independent variables included in our integrated model, such as interest margin, dividends and provisions, may be simultaneously determined by the dependent variable. When the unobserved effect is correlated to the independent variables, pooled OLS regression produces estimations that are biased and inconsistent. We can overcome this econometric issue by using either first-differences or fixed effects (within) estimators (Nickell, 1981). However, if the condition of strict exogeneity of the independent variables fails, either the first-differences or the fixed effects (within) estimators will be inconsistent and will have different probability limits. The general approach for estimating models that do not satisfy strict exogeneity is to use a transformation to eliminate the unobservable effects and instruments to deal with endogeneity (Wooldridge, 2002). Thus, we use the two-step system estimator (SE) with adjusted standard errors for potential heteroskedasticity, as proposed by Blundell and Bond (1998). This econometric method considers the unobserved effect transforming the variables into first differences and uses the generalized method of moments (GMM) to deal with endogeneity problems. In this model, it is therefore also necessary to use an estimator that reduces the problem of weak instruments, substituting the specification in differences for the original regression specified in levels such as the system estimator (Blundell & Bond, 1998). Running the model in this way, the system estimator involves two kinds of

equations with their own instruments. The first category of equations is in levels, its instruments being the lagged differences in the dependent variable and the independent variables. The second category of equations consists of equations in first differences with the levels of the dependent variable and the independent variables as instruments (Bond, 2002; Wooldridge, 2002). In our case, by using the GMM method we can build instruments for those variables that are potentially endogenous (interest margin, dividends, and provisions).

The consistency of the two-step system GMM estimator (Blundell & Bond, 1998) depends on both the validity of the assumption that the error term does not show a second-order serial correlation and the validity of the instruments. To control for these points, we apply two specification tests used by Arellano and Bond (1991) in the regressions: the Sargan–Hansen test to test for the joint validity of the selected instruments and the test of non-second-order serial correlation. In the latter case, we aim to verify that the differenced error term does not present second-order correlation. However, due its very composition, the differenced error term is likely to present first-order correlation, even if the original error term is absent from it. We use the adjustment for small samples proposed by Windmeijer (2005) to avoid any potential downward bias in the estimated asymptotic standard errors.

Our model is thus as follows

$$(C2020)_{(l,t)} = \beta_0 + \beta_1(CEOCH)_{(l,t)} + \beta_2(VPBZE)_{(l,t)} + \beta_3(TIEDTINED)_{(l,t)} + \beta_4(EXEDED)_{(l,t)} + \beta_5(DTEDED)_{(l,t)} + \beta_6(AGEDNED)_{(l,t)} + \beta_7(NATED)_{(l,t)} + \beta_8(NATNED)_{(l,t)} + \beta_9(ATTNED)_{(l,t)} + \beta_{10}(LNTINTA)_{(l,t)} + \beta_{11}(DIVTA)_{(l,t)} + \beta_{12}(PROVTA)_{(l,t)} + \beta_{13.....}(CONTROL\ VARIABLES)_{(l,t)} + \beta_{14...}(COUNTRYDUMMIES)_{(t)} + v_{(l,t)}. \quad (7)$$

3.3 | Probit analysis

The last analytical tool we use is probit multivariate analysis. This is a multivariate panel logistic fixed-effect regression analysis to examine both bank-level and board characteristics of the process to decide whether the bank changes the size and/or the composition of its board (Parsons & Titman, 2008). Following Dang (2013), the main model takes the form:

$$\Pr(Y = 1 \mid X) = 1/(1 + e\text{^}(-(\alpha + X\beta)\,)) \quad (8)$$

where Y is a binary variable that could be SCAMD or VCOD. SCAMD takes the value of 1 if the bank board modified its composition as a consequence of the announcement in that year and 0 otherwise. VCOD is likewise a binary variable that takes the value of 1 if the bank board modified its size in a given year because of the announcement and 0 otherwise. X is a vector compounded by the bank, board, and director characteristics covariates that determine the decision to modify the composition and/or size of the board, β is the vector of coefficients, and α is the constant term. X includes the following variables: variation in board size; CEO influence over the board; time in the role, experience, distraction, age, and education of the directors; gender balance, geographical origin, attrition, and gender balance; and interest margin, dividend policy and bank loan risk, as our financial variables. The X vector also includes country-level covariates to measure the quality of the legal and regulatory environment and control variables to account for G-SIBs, Eastern European countries, the Great Financial crisis, one/two-tier boards, large/small countries, and delisted banks during the sample period (2003–2015).

Given that the residuals may be correlated across firms or across time in the OLS estimations, the standard errors may be biased. Consequently, as suggested by Petersen (2009), we use the logistic estimation with robust standard errors that are adjusted for heteroskedasticity and clustered by bank. The results report estimated coefficients and the conditional marginal effects at means that correspond to the partial derivatives $\partial \Pr(ZL\_it = 1)/\partial X$. According to Bartus (2005), this marginal effect measures the marginal change in the predicted probability of a bank presenting a change in the size and/or composition of its board resulting from a marginal change in a continuous independent variable or from a switch in a dummy variable from zero to one, ceteris paribus.

4 | VARIABLES AND DATA

Our sample includes the banks available on the Boardex database that meet the following two conditions: they are listed on a European stock exchange and they announced changes in board size and/or composition in the period 2003–2015. The final sample consists of 608 announcements made by 75 banks that have their headquarters in 19 European countries. In 44 out of these 75 banks, there is more than one announcement in the same year (see Tables 2a, 2b, 2c, and 2d).

TABLE 2a Announcements by region

	No. of announcements	No. of banks
EU countries	551	68
EURO area	401	52
NON-EURO area	150	16
NON-EU countries	57	7
Total	608	75

TABLE 2b Announcements by year

No. of announcements		608
Before 2007		132
During GFC		268
2007	53	
2008	58	
2009	80	
2010	77	
After 2010		208

TABLE 2c Announcements by G-SIB/non G-SIB

	No. of announcements		No. of Banks	
Total		608		75
G-SIB		163		13
EURO area	82		8	
NON-EURO area	81		5	
Non-GSIB Banks		445		62

TABLE 2d Announcements by type

Total no. of announcements			**608**
Change in board size		341	
Increases in board size		136	
Increases in ED	45		
Increases in NED	91		
Reductions in board size		205	
Reductions in ED	81		
Reductions in NED	124		
Change in board composition		267	
Total no. of banks			75

Having identified the announcements, we now collect financial data as well as data on board size and composition and directors' attributes in our sample of banks for all the available years in the period 2003–2015. The financial information on banks comes from the SNL database, while the information on boards comes from the Boardex database.

Therefore, we build two panel data sets, one for the banks with announcements that only change the composition of the board and the other for the banks that change both the size and composition of the board. The first panel, in which we observe only changes in board composition, includes 766 observations and 73 groups (Table 3), while the second panel comprises 942 observations and 100 groups (Table 4).[5]

The panel includes at least five consecutive years for each bank announcement in order to preserve the asymptoticity of the results in the estimations. When there is more than one announcement for the same bank in the same year, we generate a new group for each announcement. The first panel contains 57 banks with announcements that modify the composition of the board without changing its size. Sixteen out of these 57 banks present more than one announcement in the same year, resulting in 16 additional groups for a total of 73 groups of announcements. The banks included in the first panel are headquartered in 18 European countries.

In the second panel, in which the announcements generate a change in board size, there are 67 banks. As in the first panel, it includes at least five consecutive years for each announcement. When there is more than one announcement for the same bank in the same year, we generate a new group for each announcement. In 33 out of the 67 banks, there is more than one announcement in the same year. The number of groups in this panel is 100 and the number of observations, 956. Banks in this panel are headquartered in 19 European countries.

TABLE 3 Observations by country in the sample of announcements in which the size of the board remains the same but the composition changes

	Observations	Banks	Banks with more than one announcement in the same year
Austria	25	2	
Belgium	39	3	1
Czech R.	10	1	
Denmark	56	5	1
France	71	4	3
Germany	82	5	2
Greece	46	3	2
Italy	76	7	1
Netherlands	17	2	
Norway	17	2	
Poland	17	2	
Portugal	26	2	
R. of Ireland	61	3	3
Russian Fed.	11	1	
Spain	75	5	1
Sweden	49	3	1
Switzerland	30	2	1
United Kingdom	58	5	
Total	766	57	16

In order to measure changes in board size, we build the variable VPBZE. This computes the change in the number of directors divided by board size. To measure CEO influence over the board, we use a dummy variable, CEOCH, which takes the value of 1 if the CEO and the chairman of the board are one and the same person and 0 otherwise.

Directors' tenure on the board is measured via the average number of years the directors have sat on the board. We compute the average number of years that executive directors have been on the board divided by the average number of years non-executive directors have held their position: TIEDTINED. The number of boards on which directors have sat before joining the bank is our measure of director experience. We compute the experience of executive directors as the number of previous boards they have sat on divided by the number of executive directors: EXEDED.

Another variable that could influence the decision regarding changes in the composition and size of the board is director distraction. We measure the distraction of executive directors as the number of boards on which they sit along with their duties on the current board divided by the number of executive directors: DTEDED. Director seniority can be measured via their age. We thus calculate the

TABLE 4 Observations by country in the sample of announcements that modify the size of the board

	Observations	Banks	Banks with more than one announcement in the same year
Austria	33	3	
Belgium	35	2	1
Cyprus	20	1	1
Czech R.	9	1	
Denmark	60	6	2
France	62	4	1
Germany	98	6	4
Greece	45	4	1
Italy	100	8	5
Netherlands	24	2	1
Norway	17	2	
Poland	23	2	1
Portugal	32	2	1
R. of Ireland	95	4	7
Russian Fed.	30	2	1
Spain	90	6	2
Sweden	48	3	1
Switzerland	52	3	3
United Kingdom	69	6	1
Total	942	67	33

average age of executive directors: AGED; the average age of non-executive directors: AGNED; and the ratio of AGED to AGNED: AGEDNED, which is the variable we use to measure board seniority.

The geographical origin of directors is calculated as the proportion of executives that come from the same country where the bank has its headquarters: NATED, whereas NATNED is the proportion of non-executive directors that are from the bank's country of origin. The influence of gender in bank boards has been analyzed with two dummy variables: MALED and MALNED. The first takes the value of 1 in those years when 100% of board executives are male, and 0 otherwise. The second one takes the value of 1 if 100% of a board's non-executive directors in a particular year are males, and 0 otherwise. The last variable used to measure board characteristics is director attrition over the last 3 years. We accordingly use non-executive directors' attrition: ATTNED.

We also build variables to measure the financial characteristics of each bank. We focus on three characteristics that might influence the decision to modify the composition and/or size of the board: interest income over total assets (LNINTA), to measure the bank's interest margin; dividends over total assets (DIVTA), to take into account dividend policy; and provisions over total assets (PROVTA), to measure risk.

We control for a number of factors, including the effects of financial crisis, the reinforced requirements for Globally Systemically Important Banks, stock market sentiment, the presence of banks from Eastern European countries, the combination of banks with one-tier boards with those having two-tier boards, if banks have their headquarters in a large or small country, or if the bank has been delisted during the sample period.

The quality of banking corporate governance during the 2007–2008 financial crisis has been under scrutiny. To control for the effects of the financial crisis on banking corporate governance, we have included a dummy variable GFCD that takes the value of 1 during those years, and 0 otherwise (see Fernandes et al., 2018, for a survey on bank governance and performance).

The Financial Stability Board (FSB) compiles a list of banks that merit particular attention: Globally Systemically Important Banks (G-SIB). This set of banks includes very large banks that operate internationally. To take into account the specificity of these banks we have included a dummy variable: GSIBD, which takes the value of 1 for those banks on the FSB list, and 0 otherwise.

Eastern European countries represent a special environment because they have been accelerating their transformation into market economies. Banks from Eastern European countries are more and more relevant in any research about European banks.[6] For that reason, we have created the dummy variable ECD, which takes the value of 1 when the bank has its headquarters in Russia, the Czech Republic, or Poland,[7] and 0 otherwise.

In our sample, there are banks whose boards are one-tier, with executives and non-executives combined in the same board and banks with two-tier boards where executives and non-executives are split into two boards. To acknowledge such a difference, we propose the dummy variable TD that takes the value of 1 if the bank has a one-tier board, and 0 otherwise.

To control for differences in banks that have their origins and headquarters in large or small countries, we have built the dummy variable PG that takes the value of 1 if the bank has its headquarters in Russia, Italy, the United Kingdom, Spain, Poland, Germany or France, and 0 otherwise.

In our sample, there are banks that are delisted. To avoid the survivorship bias, we have included them, but at the same time, such an event could be considered a sign of trouble in those banks that generated their delisting most often as a consequence of a merger or a friendly takeover. The dummy variable DLT takes the value of 1 for those banks that were delisted, and 0 otherwise (see Table 5 for definition and descriptive statistics of variables).

5 | RESULTS

5.1 | Investors' assessment of bank board changes

The event study analysis allowed us to perform the analysis of the stock market reactions to announcements of board changes. The result of this analysis generates abnormal returns as a consequence of the announcement, assuming that, in an efficient market, prices anticipate the costs and benefits of the new information. We

TABLE 5 Descriptive Statistics of the variables

Variable	Definition	Mean	Max	Min
CAR(−20, +20)	Abnormal returns	−0.02	0.93	−1.23
CEOCH	A dummy variable that is equal to 1 if CEO = Chairman and 0 otherwise	0.01	1.00	0.00
VPBZE	Change in the number of directors/board size	−0.01	0.57	−1.00
TIEDTINED	Directors' tenure: Average no. years exec. directors have sat on the board/ average no. years non-exec. directors have sat on the board	0.95	4.88	0.00
EXEDED	Executive directors' experience: number of previous boards/number of executive directors	3.47	33.00	0.00
DTEDED	Distraction: number of current boards executive directors sit on/number of executive directors	1.42	15.00	0.00
AGEDNED	Seniority: average age of exec. Directors/average age of non-exec. directors	0.81	1.33	0.00
NATED	Geographical origin: proportion of exec. directors from the bank's country of origin	0.08	0.70	0.00
NATNED	Geographical origin: proportion of non-exec. directors from the bank's country of origin	0.28	0.90	0.00
ATTNED(%)	Attrition: Non-exec. directors' attrition over the last 3 years	47.82	355.30	0.00
LNINTA	Interest income/total assets	0.03	0.18	−0.03
DIVTA	Dividends/total assets	0.00	0.05	0.00
PROVTA	Provisions/total assets	0.01	0.07	0.00
GSIB	A dummy variable that is equal 1 when the bank is or has been GSIB	0.25	1.00	0.00
TD	A dummy variable that is equal 1 when the bank is one tier and 0 otherwise	0.84	1.00	0.00
PG	A dummy variable that is equal 1 when the bank's headquarters are located in a large country	0.50	1.00	0.00
DLT	A dummy variable that is equal 1 if the bank has been delisted in the sample period	0.17	1.00	0.00
ECD	A dummy variable that is equal 1 when the bank is headquartered in an Eastern European country	0.07	1.00	0.00
GFCD	A dummy variable that is equal 1 during the years of the Great Financial Crisis	0.17	1.00	0.00
CORGOV	It is the first factor on a factor analysis that includes all those variables that characterize a board	0.00	2.89	−2.76
MSD	A dummy variable that takes the value of 1 in those years when the stock market index of the country where the bank is listed has experienced a contraction (see Table 16)	0.33	1.00	0.00
EURO	A dummy variable that is equal 1 if the bank is headquartered in the Euro Area	0.67	1.00	0.00
MALED	A dummy variable that is equal 1 if 100% of the executive members of the board are males	0.75	1.00	0.00
MALNED	A dummy variable that is equal 1 if 100% of the non-executives members of the board are males	0.18	1.00	0.00
INHAB	Number of inhabitants of the city where the bank's headquarters are located (thousands)	2,396.78	15,300	8.4
DISTANC	Distance (km) of the bank's headquarters to the nearest airport	25.3	115	3

calculate the cumulative average abnormal returns (CAAR) for every announcement in the selected windows around each event. As can be seen in Tables 6–8, the analysis shows that the market reacts significantly for the whole sample and each subsample: announcements that modify board composition but not its size and announcements that modify both the composition and size of the board.

In the case of the sample including the total number of announcements (Table 6), a negative and significant reaction is observed for the long-term time window (−20, +20) with a CAAR of −1.20% that maintains the same sign, though a lower figure, in the days before the event. However, once the news is confirmed, the market reacts with small positive abnormal returns. The same pattern is observed when the sample is subdivided according to the type of announcement, that is, a change in board size or changes in its composition. However, if we focus on the longer time window, the reaction is greater when the changes refer to the composition of the board, in which case CAAR of −1.51% are observed.

TABLE 6 The stock market reaction to changes in board

Event window	CAAR %	*T* test	Patell *Z*	Boehmer
Change in board				
(−20, +20)	−1.20	−17.715*	−38.079***	−29.413***
(−3, +3)	−0.13	−0.458	−0.382	−0.809
(−1, +1)	0.30	16.155	11.849**	20.728
(−5, 0)	−0.75	−28.812***	−32.755***	−21.445**
(0, +5)	0.50	19.386*	17.555*	11.638
Change in board size				
(−20, +20)	−0.96	−11.397	−21.590**	−16.915*
(−3, +3)	−0.08	−0.237	−0.192	−0.421
(−1, +1)	0.15	0.651	0.434	10.014
(−5, 0)	−0.84	−25.992***	−24.562**	−16.066
(0, +5)	0.62	19.140*	15.445	10.262
Change board composition				
(−20, +20)	−1.51	−13.635	−33.051***	−25.068**
(−3, +3)	−0.19	−0.408	−0.351	−0.745
(−1, +1)	0.48	16.216	13.299**	19.953
(−5, 0)	−0.63	−14.901	−21.670**	−14.177
(0, +5)	0.36	0.842	0.904	0.597

Note: The table contains the results of the event study analysis for five different windows. We estimate the market model for each bank's returns related to the return of a stock index in the country where the bank has its headquarters. The event date is when the announcement was made public. The model was estimated from the daily returns calculated on the basis of the closing prices of each security and each index listed over a period of 240 trading days, ending 20 days before the date of the announcement. We estimate the cumulative abnormal returns (CAR) over different event windows around the event date ($t = 0$). The figure is the estimated cumulative average abnormal return (CAAR).

*Significant at 10% of the estimated coefficient.

**Significant at 5% of the estimated coefficient.

***Significant at 1% of the estimated coefficient.

TABLE 7 The stock market reaction to changes in number of executive directors and non-executive directors

Event window	CAAR %	*T* test	Patell *Z*	Boehmer
Change in number of ED				
(−20, +20)	−0.75	−0.579	−20.830**	−15.702
(−3, +3)	−0.99	−18.419*	−11.577**	−23.999*
(−1, +1)	−0.84	−23.788**	−13.128*	−19.184
(−5, 0)	−1.41	−28.443***	−31.731***	−18.570*
(0, +5)	−0.08	−0.163	−0.876	−0.500
Change in number of NED				
(−20, +20)	−1.08	−0.985	−11.256	−0.902
(−3, +3)	0.45	0.986	0.965	13.038
(−1, +1)	0.72	24.371**	18.555***	27.259*
(−5, 0)	−0.50	−11.928	−0.667	−0.473
(0, +5)	1.03	24.404**	26.131***	19.584*

Note: The table contains the results of the event study analysis for five different windows. We estimate the market model for each bank's returns related to the return of a stock index in the country where the bank has its headquarters. The event date is when the announcement was made public. The model was estimated from the daily returns calculated on the basis of the closing prices of each security and each index listed over a period of 240 trading days, ending 20 days before the date of the announcement. We estimate the cumulative abnormal returns (CAR) over different event windows around the event date ($t = 0$). The figure is the estimated cumulative average abnormal return (CAAR).

*Significant at 10% of the estimated coefficient.

**Significant at 5% of the estimated coefficient.

***Significant at 1% of the estimated coefficient.

TABLE 8 The stock market reaction to an increase or a decrease in board size

Event window	CAAR %	*T* test	Patell *Z*	Boehmer
Increases in board size				
(−20, +20)	−0.70	−0.525	−14.873	−10.212
(−3, +3)	0.46	0.840	0.166	0.140
(−1, +1)	0.87	24.069**	12.351	0.809
(−5, 0)	−0.96	−18.744*	−25.294**	−14.836
(0, +5)	1.41	27.504***	18.361*	12.887
Increases in ED				
(−20, +20)	0.23	0.100	−19.283**	−14.407
(−3, +3)	−0.69	−0.719	−14.209	−13.151
(−1, +1)	−0.79	−12.619	−16.425	−13.442
(−5, 0)	−0.92	−10.410	−23.676**	−12.197
(0, +5)	−0.85	−0.964	−15.003	−11.922
Increases in NED				
(−20, +20)	−1.16	−0.711	−0.493	−0.327
(−3, +3)	1.03	15.281	11.587	0.950
(−1, +1)	1.69	38.202***	25.987***	15.970
(−5, 0)	−0.98	−15.593	−14.537	−0.913
(0, +5)	2.52	40.312***	32.279***	22.020**
Decreases in board size				
(−20, +20)	−1.13	−10.426	−15.738	−13.721
(−3, +3)	−0.44	−0.991	−0.676	−0.502
(−1, +1)	−0.33	−11.223	0.289	0.176
(−5, 0)	−0.76	−18.254*	−11.127	−0.793
(0, +5)	0.09	0.227	0.501	0.322
Decreases in ED				
(−20, +20)	−1.30	−0.833	−11.845	−0.894
(−3, +3)	−1.15	−17.950*	−19.343*	−12.002
(−1, +1)	−0.86	−20.428**	−11.858	−0.622
(−5, 0)	−1.69	−28.289***	−22.098	−13.902
(0, +5)	0.35	0.584	−0.008	−0.004
Decreases in NED				
(−20, +20)	−1.03	−0.693	−10.630	−10.487
(−3, +3)	0.02	0.031	0.720	0.642
(−1, +1)	0.02	0.041	13.526	0.941
(−5, 0)	−0.15	−0.279	0.381	0.303
(0, +5)	−0.07	−0.125	0.656	0.539

Note: The table contains the results of the event study analysis for five different windows. We estimate the market model for each bank's returns related to the return of a stock index in the country where the bank has its headquarters. The event date is when the announcement was made public. The model was estimated from the daily returns calculated on the basis of the closing prices of each security and each index listed over a period of 240 trading days, ending 20 days before the date of the announcement. We estimate the cumulative abnormal returns (CAR) over different event windows around the event date ($t = 0$). The figure is the estimated cumulative average abnormal return (CAAR).

*Significant at 10% of the estimated coefficient.

**Significant at 5% of the estimated coefficient.

***Significant at 1% of the estimated coefficient.

Therefore, our empirical evidence confirms a negative market reaction around the announcement date. Such negative reaction is not uniform. Before the announcement, there is a negative market reaction in the window (−5, 0) when investors can anticipate board changes, but they have no information regarding the extent or relevance of such changes and how such changes could modify the bank's

expectations. However, after the announcement, once the nature of the changes is known, market reaction is positive in the window (0, +5). Thus, before the event, when uncertainty is higher, investors overreact negatively; however, when said uncertainty disappears, after the announcement, investors moderate this negative overreaction. Overall, the result is a negative market reaction around the event because the positive reaction after the announcement is lower than the negative market reaction before the announcement.

We further analyze market reaction for the subsample of board size changes. Table 7 shows how the market reacts when the board announces changes in the number of executive directors (ED) or in the number of non-executives directors (NED). Table 8 provides our results distinguishing between reductions or increases in board size. In both tables we observe an overall negative reaction which is highly negative before the announcement but turns slightly positive after the event. The exception is when the board announces an increase in the number of non-executive directors (NED). The market values positively an increase in the number of NED with abnormal returns of +1.69% in the window (−1, +1) and of +2.52% in the window (0, +5). This result allows us to conclude that investors consider that a large number of NED improves the board's ability to monitor and advise. Furthermore, the new NED board members will contribute to solving agency conflicts.

5.2 | Board director characteristics, the bank's financial situation, and the reaction of investors

Having observed abnormal returns around the announcements of changes in board size and/or composition, we perform a regression analysis to find the variables that help to explain these abnormal returns.[8] The explanatory variables are board characteristics, directors' personal traits, three financial variables of every bank in the sample and control variables, as shown in Table 5. The dependent variables are the cumulative abnormal returns (CAR) of the (−20, +20) window around the announcement of a change in the board, a window for which we observed a negative average market reaction, more intense in the case of changes in the composition of the board.

The first regression analysis we perform is a Heckman model in order to take into account possible selection bias in our sample, given that we have not randomly selected our sample of banks in which announcements regarding board changes occurred.

Our results for the subsample with changes in board composition show that the abnormal returns generated around the announcement date increase when the CEO and the chairman is one and the same person (CEOCH). However, the dividend policy (DIVTA) and the risk of the bank (PROVTA) are found to have a negative influence on these returns (Table 9).

Our two-step system GMM results show that none of our variables explains the abnormal returns observed around the announcements of changes in board composition without altering its size.

The Heckman analysis for the subsample with a change in board size shows that a large increase in directors, the strong presence of local directors, and higher dividends reduce abnormal returns. Announcements made during the great financial crisis generated more negative abnormal returns than in the rest of our period of study. However, when the CEO and the chairman is one and the same person (CEOCH), the executive directors have more seniority than the non-executive board members, and for Globally Systemic Important banks, there is a positive market reaction around the announcement date with higher abnormal returns (Table 10). Our result concerning the positive effect of having the same person as CEO and Chairman on the one hand contradicts the Shivdasani and Yermack (1999) evidence for non-financial firms, in that cumulative abnormal returns are lower when the CEO has a greater influence over director selection. On the other hand, our result is weakened by the fact that it is not significant when we perform a robustness check. Thus, our empirical evidence is not strong enough to confirm such divergence for banks.

If we apply the two-step system GMM to address the problems of unobservable heterogeneity and endogeneity, the results show that abnormal returns around the announcement dates in which the size of the board changes are: the changes in the number of directors following the announcement (VPBZE) and the dividend policy (DIVTA). Announcements by banks with larger boards and a generous dividend policy produce a lower abnormal reaction by investors to changes in board size. On the other hand, the higher seniority of executive directors increases abnormal returns.

5.3 | Variables that predict bank announcements regarding changes in board size and composition

We perform a probit analysis to identify the variables that increase the probability of a bank's announcement to change the composition of the board, but not its size, where the variable SCAMD takes the value of 1 if the announcement takes place and 0 otherwise. To understand the economic significance of the announcement of a new director appointee and/or a change in the composition of the board, we calculate estimated probabilities by evaluating the partial derivatives of the probit models at the means for the significant variables.

We find two variables that increase the likelihood of a bank making an announcement of changes in the composition of its board: the proportion of local non-executive directors and during the great financial crisis. Thus, a high proportion of same nationality non-executives increases the likelihood of an announcement on board changes by 14.65%, and during the great financial crisis, the announcements about changes on board composition were 14.86% more likely than in the rest of our period of analysis. However, when the attrition of non-executive directors is high, the non-executive directors are all male and banks are headquartered in an Eastern European country, and the likelihood of an announcement to modify board composition is lower. All male non-executive boards are 10.41% less likely to announce changes in board composition than boards with at least one female non-executive director. Moreover, Eastern European banks are 33.44% less likely to announce changes in their board composition

TABLE 9 Regression results for the sample with changes in board composition

Abnormal returns	Change in board composition		
Variables	**Heckman selection model**	**Fixed-effects regression**	**Panel-data estimation, two-step system**
CEOCH	0.741*** (0.000)	0.262*** (0.000)	0.207 (0.667)
TIEDTINED	0.010 (0.512)	−0.007 (0.337)	−0.018 (0.873)
EXEDED	0.002 (0.573)	0.004** (0.013)	0.010 (0.571)
DTEDED	−0.010 (0.263)	−0.009* (0.052)	−0.017 (0.502)
AGEDNED	0.007 (0.900)	0.015 (0.541)	0.074 (0.546)
NATED	−0.007 (0.929)	0.011 (0.760)	0.030 (0.683)
NATNED	−0.014 (0.768)	−0.061* (0.054)	−0.047 (0.730)
ATTNED	0.001 (0.296)	0.000 (0.326)	−0.000 (0.855)
LNINTA	−0.073 (0.871)	0.031 (0.905)	−0.200 (0.687)
DIVTA	−2.922** (0.012)	−1.672*** (0.003)	−1.509 (0.473)
PROVTA	−4.233*** (0.001)	−0.025 (0.959)	1.146 (0.458)
COUNTRY & TIME DUMMIES	YES	YES	YES
lambda	0.007 (0.873)		
Observations	766	766	766
Wald	57.29		
p value	2.92e−06		
Rho	0.038		
Sigma	0.171		
R-squared		0.080	
F value		5.367	
F test allu = 0		1.064	
AR1			−4.06
p value			5.38e−05
AR2			−1.24
p value			0.22
Hansen test			65.78
p value			0.30
Sargan test			67.58
p value			0.30

Note: The table contains the results of the regressions for the sample of banks with changes in composition only for the period 2003–2015. The dependent variable is abnormal returns (−20, +20). The independent variables are as follows: Chairman and CEO are the same person (CEOCH), Directors tenure (TIEDTINED), Executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), geographical origin executives (NATED), geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), Ln of interest income over total assets (LNINTA), dividend policy (DIVTA), and provisions over total assets (PROVTA). We have included the country and time dummy variables. The figure is the estimated value for the coefficient. In parentheses are the *p* values.

*Significant at 10% of the estimated coefficient.

**Significant at 5% of the estimated coefficient.

***Significant at 1% of the estimated coefficient.

than their Western European competitors. By country, Spanish, French, Dutch, and Greek banks are 21.88%, 20.45%, 18.31%, and 12.56%, respectively, less likely to announce changes in board composition than the banks headquartered in the rest of the countries in the sample (Tables 11 and 12).

The variable VCOD takes the value of 1 if the announcement that modifies the size of the board takes place and 0 otherwise. The probability that a bank will make an announcement to change the composition of the board and its size decreases the higher the proportion of new appointees is over the total size of the board (VPBZE). According to our results, a 1% increase in the proportion of new appointees over board size lowers the probability of an announcement of changes in board size and composition by 0.72%. If the same person holds the positions of CEO and Chairman, the probability of an announcement is 22.18% lower; when the board is highly distracted participating in several boards simultaneously also lowers the

TABLE 10 Regression results for the sample of banks with changes in board size

Abnormal returns	Change in board size		
Variables	**Heckman selection model**	**Fixed-effects regression**	**Panel data estimation, two step system**
VPBZE	−0.180** (0.033)	−0.123*** (0.007)	−0.330** (0.029)
CEOCH	0.586*** (0.000)	0.169*** (0.000)	0.325 (0.347)
TIEDTINED	−0.024 (0.112)	−0.020** (0.018)	0.019 (0.705)
EXEDED	−0.003 (0.426)	0.002 (0.406)	−0.004 (0.706)
DTEDED	−0.005 (0.703)	−0.005 (0.380)	−0.013 (0.676)
AGEDNED	0.112** (0.016)	0.057** (0.041)	0.170** (0.026)
NATED	−0.031 (0.645)	0.009 (0.832)	−0.052 (0.774)
NATNED	−0.149*** (0.007)	−0.141*** (0.000)	−0.334 (0.162)
ATTNED	0.000 (0.591)	0.000** (0.027)	0.000 (0.781)
LNINTA	−0.598 (0.317)	−0.439 (0.205)	−1.176 (0.143)
DIVTA	−4.357*** (0.001)	−2.943*** (0.000)	−3.857** (0.038)
PROVTA	−1.250 (0.309)	0.353 (0.494)	0.253 (0.860)
GSIBD	0.106*** (0.002)	−0.001 (0.942)	0.015 (0.339)
GFCD	−0.060** (0.035)	−0.021 (0.101)	0.006 (0.710)
COUNTRY & TIME DUMMIES	YES	YES	YES
Lambda	0.032 (0.512)		
Observations	942	942	942
Wald	86.68		
p value	0.000		
Rho	0.166		
Sigma	0.192		
R-squared		0.091	
F value		5.910	
F test allu = 0		1.002	
AR1			−3.411
p value			0.001
AR2			−1.385
p value			0.166
Hansen test			58.88
p value			0.269
Sargan test			59.33
p value			0.256

Note: The table contains the results of the regressions for the sample of banks with changes in composition and size for the period 2003–2015. The dependent variable is abnormal returns (−20, +20). The independent variables are as follows: Relative weight of new appointees in the board (VPBZE), Chairman and CEO are the same person (CEOCH), Directors tenure (TIEDTINED), Executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), geographical origin executives (NATED), geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), Ln of interest income over total assets (LNINTA), dividend policy (DIVTA) and provisions over total assets (PROVTA), dummy variable for G-SIB (GSIBD), and the dummy variable for the years of 2007–2008 financial crisis (GFCD). We have included the country and time dummy variables. The figure is the estimated value for the coefficient. In parentheses are the *p* values.

*Significant at 10% of the estimated coefficient.

**Significant at 5% of the estimated coefficient.

***Significant at 1% of the estimated coefficient.

likelihood that said bank will announce changes in board size by 6.19%. One-tier boards are 25.5% less likely to announce board changes than two-tier boards, and banks whose headquarters are located in a large country are 27.74% less likely to make such announcements than banks located in small countries. Banks in trouble are 12.13% less likely to announce changes in board size and composition. Banks whose non-executives are all male are 8.73% less likely to make announcements of changes in board size. Finally, banks

TABLE 11 Probit results for the sample with changes in board composition

SCAMD	Change in board composition
Variables	Random effects probit regression
CEOCH	0.062 (0.891)
TIEDTINED	0.060 (0.517)
EXEDED	0.012 (0.430)
DTEDED	−0.043 (0.258)
AGEDNED	−0.256 (0.196)
NATED	−0.415 (0.185)
NATNED	0.414* (0.052)
ATTNED	−0.007*** (0.000)
LNINTA	2.453 (0.402)
DIVTA	9.255 (0.173)
PROVTA	6.332 (0.286)
ECD	−0.944*** (0.000)
GFCD	0.420*** (0.001)
MALNED	−0.294** (0.012)
COUNTRY & TIME DUMMIES	YES
lnsig2u	−3.605** (0.015)
Observations	766
Wald test	492.7
p value	0
Log pseudolikelihood	−447.5

Note: The table contains the results of the probit analysis for the sample of banks with changes in composition only for the period 2003–2015. The dependent variable is SCAMD that takes the value of 1 if the announcement of changes in board composition takes place and 0 otherwise. The independent variables are as follows: Chairman and CEO are the same person (CEOCH), Directors tenure (TIEDTINED), Executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), geographical origin executives (NATED), geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), 100% of non-executives are males (MALNED), Ln of interest income over total assets (LNINTA), dividend policy (DIVTA), provisions over total assets (PROVTA), banks headquartered in Eastern European countries (ECD), and 2007–2008 financial crisis (GFCD). We have included the country and time dummy variables. The figure is the estimated value for the coefficient. In parentheses are the *p* values.
*Significant at 10% of the estimated coefficient.
**Significant at 5% of the estimated coefficient.
***Significant at 1% of the estimated coefficient.

TABLE 12 Probit marginal effects for the sample with changes in board composition

	Change in board composition	
SCAMD	Cond. marginal effects at means	*p* value
NATNED	0.147*	0.052
ATTNED	−0.002***	0.000
ECD	−0.334***	0.000
GFCD	0.149***	0.001
MALNED	−0.104**	0.011
FRANCE	−0.205***	0.002
GREECE	−0.126*	0.071
NETHERLANDS	−0.183***	0.002
SPAIN	−0.219***	0.000

Note: The table contains the conditional marginal effect at means for the sample of banks with changes in composition only for the period 2003–2015. The dependent variable is SCAMD that takes the value of 1 if the announcement of changes in board composition takes place and 0 otherwise. The independent variables are as follows: geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), banks headquartered in Eastern European countries (ECD), 2007–2008 financial crisis (GFCD), and the country dummies for France, Greece, Netherlands, and Spain. The figures are the estimated values for the conditional marginal effects at means and *p* values.
*Significant at 10% of the estimated coefficient.
**Significant at 5% of the estimated coefficient.
***Significant at 1% of the estimated coefficient.

located in Austria are 41.51% less likely to make announcements than the banks headquartered in the rest of the countries.

By contrast, having boards with greater executive experience and seniority increases the chances of an announcement modifying board size by 1.24% and 18.36%, respectively. Banks with a higher interest margin are more likely to announce changes in board size than banks observing a reduction in their board size. Among countries, banks from the United Kingdom and Ireland are 39.49% and 21.76%, respectively, more likely to announce changes in board size (Tables 13 and 14).

6 | ROBUSTNESS

We repeat the analysis using alternative variables. We now measure board size via the number of board directors, computing its logarithm to avoid issues of heteroskedasticity (BSIZE). Another measure of changes in board size that we use is VEDBS to represent the variation in executive directors after the announcement. We compute this variation as the change in the number of executive directors following the announcement divided by the number of directors. Similarly, the variation in non-executive directors (VNEDBS) is computed as the change in non-executive directors over the total number of directors.

For non-executive directors, we compute their experience as the number of previous boards on which they sat divided by the number of non-executive directors on the current board: EXNEDNED. To compare the experience of executive directors with that of non-executive board members, we compute the number of previous boards on which executive directors sat divided by the number of previous boards on which non-executive directors sat: EXEDNED. Similarly, we measure the distraction of non-executive directors as the number of boards on which they sat divided by the number of non-executive directors: DTNEDNED. To compare both types of

TABLE 13 Probit results for the sample of banks with changes in board size

VCOD	Change in board size
Variables	**Random effects probit regression**
VPBZE	−1.911*** (0.000)
CEOCH	−0.590** (0.048)
TIEDTINED	−0.059 (0.396)
EXEDED	0.033* (0.098)
DTEDED	−0.165*** (0.006)
AGEDNED	0.488** (0.013)
NATED	−0.110 (0.670)
NATNED	0.263 (0.227)
ATTNED	−0.004** (0.025)
LNINTA	7.723*** (0.008)
DIVTA	11.334 (0.112)
PROVTA	6.068 (0.202)
TD	−0.678*** (0.002)
PG	−0.737*** (0.009)
DLT	−0.322** (0.016)
MALNED	−0.232* (0.078)
COUNTRY & TIME DUMMIES	YES
lnsig2u	−4.005** (0.041)
Observations	942
Wald test	241.2
p value	0
Log pseudolikelihood	−565.5

Note: The table contains the results of the probit analysis for the sample of banks with changes in composition and size for the period 2003–2015. The dependent variable is VCOD that takes the value of 1 if the announcement of changes in board size and composition takes place and 0 otherwise. The independent variables are as follows: Chairman and CEO are the same person (CEOCH), relative weight of new appointees in the board (VPBZE), directors tenure (TIEDTINED), Executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), geographical origin executives (NATED), geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), 100% of non-executives are males (MALNED), Ln of interest income over total assets (LNINTA), dividend policy (DIVTA), provisions over total assets (PROVTA), one tier boards (TD), banks headquartered in large countries (PG), and delisted banks during the sample period (DLT). We have included the country and time dummy variables. The figure is the estimated value for the coefficient. In parentheses are the *p* values.
*Significant at 10% of the estimated coefficient.
**Significant at 5% of the estimated coefficient.
***Significant at 1% of the estimated coefficient.

director distraction, we calculate the ratio of DTEDED to DTNEDNED: DTEDNED.

Director education was not found to be relevant in our study.[9] We consider the education of executive and non-executive directors to be a variable that might influence decisions regarding the composition and size of boards. We use the index built by Boardex in the following way: board members with no university education are assigned 0; if they have a bachelor's degree, they are assigned the value of 1; if they have a master's degree, the value is 2; and, if they have a PhD degree, they are assigned a value of 3. Those directors with several degrees are assigned a score that is the sum of their degrees. The variable EDUED is the average value of education for executive directors; EDUNED is the average value of education for non-executive directors on a particular board; and EDEDNED is the result of dividing EDUED by EDUNED.

We also consider other variables to measure the effects of gender balance on the board with respect to decision-making. We calculate the gender balance of executive directors as the proportion of executives that are males: GEED; while the gender balance of non-executive directors is the proportion of males among non-executive directors: GENED. To identify differences in gender balance between executive and non-executive directors, we build the variable GEDNED, which is equal to the ratio of GEED to GENED. None of these gender balance variables are found to be significant. This result is in line with that reported by Rajgopal et al. (2019), who do not find

TABLE 14 Probit marginal effects for the sample with changes in board size

	Conditional marginal effects at means	*p* value
VPBZE	−0.719***	0.000
CEOCH	−0.222**	0.049
EXEDED	0.012*	0.100
DTEDED	−0.062***	0.006
AGEDNED	0.184**	0.013
ATTNED	−0.001**	0.024
LNINTA	2.905***	0.008
TD	−0.255***	0.002
PG	−0.277***	0.009
DLT	−0.121**	0.016
MALNED	−0.087*	0.079
AUSTRIA	−0.415***	0.000
IRELAND	0.218**	0.011
UK	0.395***	0.001

Note: The table contains the conditional marginal effect at means for the sample of banks with changes in size for the period 2003–2015. The dependent variable is VCOD that takes the value of 1 if the announcement of changes in board size takes place and 0 otherwise. The independent variables are as follows: Chairman and CEO are the same person (CEOCH), relative weight of new appointees in the board (VPBZE), executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), non-executives attrition in the last 3 years (ATTNED), 100% of non-executives are males (MALNED), Ln of interest income over total assets (LNINTA), one tier boards (TD), banks headquartered in large countries (PG), and delisted banks during the sample period (DLT) and the country dummies for Austria, Ireland, and the United Kingdom. The figures are the estimated values for the conditional marginal effects at means and *p* values.
*Significant at 10% of the estimated coefficient.
**Significant at 5% of the estimated coefficient.
***Significant at 1% of the estimated coefficient.

greater gender diversity or a higher proportion of non-executives on the bank boards after the crisis.

As an alternative to the directors' geographical origin, we calculate NEDNED as the ratio of local executive directors to local non-executive directors. Alternative measures of attrition are executive directors' attrition (ATTED3) and the comparison of executive and non-executive directors' attrition: ATEDNED, which is the ratio of ATTED to ATTNED.

We considered dummy variables to measure for corporate governance differences: if banks headquartered in the Euro zone were significant (EURO), market sentiment (MSD), and when all executive directors of a particular bank in a particular year were males (MALED). Furthermore, we designed a board governance measure (CORGOV) by bank and year using those variables that characterize a board, such as size, proportion of externals, busyness, experience, geographical, and gender divergence.

Our variable CORGOV was created by running a factor analysis with those variables that characterize a board and are highly correlated, in order to extract and summarize that information in the first factor. The variables used in the factor analysis are the number of announcements each year, number of announcements about changes in the board size, board size, variation in board size, proportion of executive directors, change in executive directors over board size, variation in the number of non-executives over board size, executives' average time in position, non-executives' average time in position, total number of boards where executives and non-executives sit or have sat, number of boards where executives are members, boards where executives sat at the same time, boards where non-executives sat at the same time, average age of executives, average age of non-executives, education of executives, education of non-executives, proportion of executive males, proportion of non-executive males, proportion of same-nationality executives, proportion of same-nationality non-executives, attrition of executives, and attrition of non-executives. This measure of corporate governance is broader than the often-used Gompers et al. (2003) "G" index because said index focuses on takeover defenses, while our proposal considers all the elements that could influence board decision-making. Furthermore, takeovers are a rare event in banks in Europe. Our measure lets us provide a continuous variable that is time and bank variant.

To control for banks headquartered in the euro zone, we have designed a variable named EURO. Thus, if the bank has its headquarters in a country whose currency is the euro, this variable takes value 1, and 0 otherwise.

Stock market prices are influenced by market sentiment at all times. To account for said market sentiment, we have designed a dummy variable MSD that takes the value of 1 in those years when the stock market index of the country where the bank is listed has experienced a contraction, while taking the value of 0 if the stock market index has increased. Table 15 shows the years when each stock index ended lower than it started at the beginning of said year for each country in our sample.

None of these control variables were significant. We also run a fixed effects regression model in which we observe that the variables explaining abnormal returns in the announcements of changes in the composition of the board without altering its size are CEOCH, EXEDED, DTEDED, NATNED, and DIVTA. When the sample includes announcements of changes in board size, the variables that explain abnormal returns are VPBZE, CEOCH, TIEDTINED, AGEDNED, NATNED, ATTNED, and DIVTA.

TABLE 15 Years where the market sentiment (MSD) was bearish

Country	Years where the value of the index at the end of the year was lower than at the beginning
Austria	2008, 2011, 2014,
Belgium	2002, 2007, 2008, 2011
Cyprus	2002, 2008, 2010, 2011, 2012, 2013, 2014, 2015
Chequia	2008, 2011, 2013, 2014
Denmark	2002, 2008, 2011
France	2002, 2008, 2010, 2011, 2014
Germany	2002, 2008, 2011
Greece	2002, 2008, 2010, 2011, 2014, 2015
Italy	2002, 2007, 2008, 2010, 2011
Netherlands	2002, 2008, 2011
Norway	2002, 2008, 2014
Poland	2002, 2008, 2011, 2013, 2014, 2015
Portugal	2002, 2008, 2010, 2011, 2014
Ireland	2002, 2007, 2008, 2010
Russia	2008, 2011, 2013, 2014
Spain	2002, 2008, 2010, 2011, 2012, 2015
Sweden	2002, 2008, 2011
Finland	2002, 2008, 2011
Switzerland	2002, 2007, 2008, 2011
UK	2002, 2007, 2008, 2011

6.1 | Robustness analyses when there is only one event per year and bank

To address the concern regarding events overlapping due to the fact that 44 out of 75 of our sample banks made several announcements per year about changes in the size and composition of their board, we have re-run all of our models taking just one event per year and bank. Consequently, the number of announcements decreases from 608 to 427. Considering just one event per bank and year does not reflect the fact that some banks introducing changes in their boards tend to announce such changes in several announcements; therefore, if we only consider the first announcement of the year, the analysis does not reflect the impact of all the changes that took place during that year, rather only the first.

Thus, the number of observations in the sample for announcements of changes in board composition decreases from 766 to 654, while in the sample of announcements of changes in board size, the number of observations goes from 942 to 706.

The event study run for the sample of 1-year events (Table 16) confirms the results previously found (Table 6). Thus, we have observed a negative and significant reaction for the long-term time window (−20, +20) when announcing changes in board size and/or composition. For the other windows around the event, the significance of the results weakens, although the signs of the CAARs remain the same.

If we divide the sample according to whether the number of executive directors (ED) or non-executive directors (NED) has been modified, or whether an increase or decrease in size was announced, Tables 17 and 18 confirm our previous results as shown in Tables 7 and 8. We have found significant and negative CAARs around the event with the exception of the changes in non-executive directors, which produce positive and significant abnormal returns in the short window (−1, +1) and 5 days following the announcement.

This additional analysis confirms our previous conclusion that considering only one event per year or the existence of multiple events each year does not invalidate our findings and that it reinforces our proposal of a sample with as many announcements as took place in each year to explain market reaction to such events.

To confirm the robustness of our regression analysis explaining changes in board composition, we have re-run the model with the sample that includes only one event per year and bank. Thus, our robustness analysis confirms our main results that the abnormal returns generated around the announcement of changes in board composition increase when the CEO and the chairman are one and the same person (CEOCH), but decrease when bank dividends (DIVTA) and provisions (PROVTA) are high (Table 19). The only difference in the results is that with the sample of one event per year, the variable director distraction (DTEDED) becomes insignificant in the fixed effects regression, but said variable was already not significant in the Heckman model and in the two-step system GMM estimations.

The robustness analysis for the subsample with a change in board size and just one event per year and bank confirms that a large increase in directors, the strong presence of local directors, and higher dividends reduce abnormal returns. It also confirms that announcements made during the great financial crisis generated more

TABLE 16 The stock market reaction to changes in board when we only compute one event per bank and year

Event window	CAAR %	*T* test	Patell *Z*	Boehmer
Change in board				
(−20, +20)	−1.08	−13.785	−21.905**	−18.555*
(−3, +3)	0.10	0.306	0.513	0.403
(−1, +1)	0.27	12.893	21.145**	13.460
(−5, 0)	−0.54	−18.068*	−0.549	−0.385
(0, +5)	0.40	13.293	0.114	0.078
Change in board size				
(−20, +20)	−1.76	−19.621**	−22.032	−16.809*
(−3, +3)	−0.29	−0.789	−0.417	−0.328
(−1, +1)	−0.08	−0.330	−0.358	−0.225
(−5, 0)	−1.08	−31.283***	−22.487**	−13.730
(0, +5)	0.26	0.746	−0.166	−0.112
Change board composition				
(−20, +20)	−0.98	−0.926	−17.502*	−14.244
(−3, +3)	0.19	0.440	0.195	0.152
(−1, +1)	0.62	21.742**	23.183**	15.416
(−5, 0)	−0.62	−15.210	−0.847	−0.565
(0, +5)	0.51	12.604	0.227	0.140

Note: The table contains the results of the event study analysis for five different windows. We estimate the market model for each bank's returns related to the return of a stock index in the country where the bank has its headquarters. The event date is when the first announcement of each year was made public. The model was estimated from the daily returns calculated on the basis of the closing prices of each security and each index listed over a period of 240 trading days, ending 20 days before the date of the announcement. We estimate the cumulative abnormal returns (CAR) over different event windows around the event date ($t = 0$). The figure is the estimated cumulative average abnormal return (CAAR).
*Significant at 10% of the estimated coefficient.
**Significant at 5% of the estimated coefficient.
***Significant at 1% of the estimated coefficient.

TABLE 17 The stock market reaction to changes in number of executive directors and non-executive directors when we only compute one event per bank and year

Event window	CAAR %	*T* test	Patell *Z*	Boehmer
Change in number of ED				
(−20, +20)	−0.80	−0.556	−16.100*	−13.697
(−3, +3)	−1.08	−18.079*	−21.372**	−14.386
(−1, +1)	−1.11	−28.383***	−29.173***	−17.462*
(−5, 0)	−1.52	−27.542***	−28.691***	−16.803*
(0, +5)	−0.15	−0.275	−10.985	−0.571
Change in number of NED				
(−20, +20)	−2.42	−21.354**	−20.634**	−15.748
(−3, +3)	0.37	0.791	11.227	0.942
(−1, +1)	0.65	21.296**	23.761**	14.863
(−5, 0)	−0.64	−14.845	−0.830	−0.546
(0, +5)	1.08	24.887**	19.192*	13.772

Note: The table contains the results of the event study analysis for five different windows. We estimate the market model for each bank's returns related to the return of a stock index in the country where the bank has its headquarters. The event date is when the first announcement of each year was made public. The model was estimated from the daily returns calculated on the basis of the closing prices of each security and each index listed over a period of 240 trading days, ending 20 days before the date of the announcement. We estimate the cumulative abnormal returns (CAR) over different event windows around the event date ($t = 0$). The figure is the estimated cumulative average abnormal return (CAAR).
*Significant at 10% of the estimated coefficient.
**Significant at 5% of the estimated coefficient.
***significant at 1% of the estimated coefficient.

TABLE 18 The stock market reaction to an increase or a decrease in board size when we only compute one event per bank and year

Event window	CAAR %	*T* test	Patell *Z*	Boehmer
Increases in board size				
(−20, +20)	−2.67	−19.509*	−21.927**	−14.628
(−3, +3)	0.08	0.147	−0.235	−0.201
(−1, +1)	0.85	22.942**	11.528	0.735
(−5, 0)	−1.44	−27.541***	−27.023***	−15.467
(0, +5)	1.35	25.692**	14.586	0.984
Decreases in board size				
(−20, +20)	−2.67	−19.509	−21.927	−14.628
(−3, +3)	0.08	0.147	−0.235	−0.201
(−1, +1)	0.85	22.942	11.528	0.735
(−5, 0)	−1.44	−27.541	−27.023	−15.467
(0, +5)	1.35	25.692	14.586	0.984

Note: The table contains the results of the event study analysis for five different windows. We estimate the market model for each bank's returns related to the return of a stock index in the country where the bank has its headquarters. The event date is when the first announcement of each year was made public. The model was estimated from the daily returns calculated on the basis of the closing prices of each security and each index listed over a period of 240 trading days, ending 20 days before the date of the announcement. We estimate the cumulative abnormal returns (CAR) over different event windows around the event date ($t = 0$). The figure is the estimated cumulative average abnormal return (CAAR).
*Significant at 10% of the estimated coefficient.
**Significant at 5% of the estimated coefficient.
***Significant at 1% of the estimated coefficient.

negative abnormal returns than in the rest of our period of study. However, the robustness analysis does not confirm that, when the CEO and the chairman are one and the same person (CEOCH), and when the executive directors have more seniority than the non-executive board members, there is a significant relation with the abnormal returns around the announcement (Table 20). The sample of one event per year and bank is particularly reduced for the subsample of changes in board size where 33 out of the 67 banks make several announcements in the same year. The lack of robustness for these results weakens our conclusions regarding the relevance of having the same person as CEO and Chairman and executive seniority as variables to explain market reaction to changes in board size announcements.

The new probit analysis performed to identify the variables that increase the probability of a bank's announcement to change the composition of the board confirms all our results with the previous sample. Thus, the likelihood of a bank making an announcement of changes in the composition of its board increases with the proportion of local non-executive directors, and during the great financial crisis. When the attrition of non-executive directors is high, the non-executive directors are all male and banks are headquartered in an Eastern European country, an announcement to modify board composition is less likely (Table 21).

If the sample includes one announcement of changes in board size per bank and year, the robustness analysis confirms that the probability that a bank will make an announcement to change the composition of the board and its size decreases the higher the proportion of new appointees is in relation to the total size of the board (VPBZE), if the same person holds the positions of CEO and Chairman, if the board is highly distracted, if attrition is high, in one-tier boards, in banks whose headquarters are located in a large country, and in banks in trouble. Said probability increases in banks with a higher interest margin (Table 22). In this robustness analysis, three variables lack significance: executives' experience, non-executives' seniority, and the proportion of non-executive males on the board.

Overall, the robustness checks confirm most of our findings. However, the discrepancies that we have found when considering only one announcement per bank and year generate a bias in our analysis as the one-announcement sample only considers the information from the first event, which means that for those banks with several events, 44 out of 75, we are not introducing the information and the changes generated by the other announcements during the year. For instance, consider the case of those banks that decide to make several announcements as to the changes in their boards in order to avoid a huge reaction if all the changes were announced in just one event. Then, the first announcement is just a test of the market reaction before announcing broader board changes. When we only consider the first event, we are losing the information from the rest of the same-year announcements. In other words, the sample with one announcement per bank and year is biased by the information provided in the first announcement and it is treating those banks that decide to make all the changes in one announcement the same as the banks that decide to gradually change their boards by making several announcements.

7 | FINAL REMARKS

After finding that bank announcements of changes in the composition and size of their boards generate abnormal returns around the dates of the announcement, we carried out an in-depth analysis to determine which variables explain why bank boards make these announcements. We distinguished between announcements in which the size of the board remains unchanged but there are changes in its composition and announcements that modify both the size and composition of the board.

Changes in bank size and composition should be related to improvements in board effectiveness, particularly when a profound financial crisis has affected these banks. However, changes in board size and composition are not always motivated by efficiency, but for reasons related to entrenchment, integrating like-minded directors to reinforce the position of the CEO, improving the CEO's social acceptability, and/or gaining political sympathies in a heavily regulated industry.

We observe negative abnormal returns after banks announce a change in board composition or size. Decreases in board size are

TABLE 19 Regression results for the sample with changes in board composition and only one event per bank and year

Abnormal returns	Changes in board composition		
Variables	**Heckman selection model**	**Fixed effects regression**	**Panel-data estimation, two step system**
CEOCH	0.412** (0.019)	0.094** (0.028)	0.319 (0.512)
TIEDTINED	−0.015 (0.418)	−0.014* (0.058)	−0.026 (0.487)
EXEDED	0.002 (0.668)	0.003* (0.077)	0.006 (0.364)
DTEDED	−0.005 (0.598)	−0.004 (0.348)	−0.010 (0.379)
AGEDNED	0.022 (0.701)	0.002 (0.921)	0.092 (0.372)
NATED	0.021 (0.775)	0.001 (0.971)	0.070 (0.446)
NATNED	−0.023 (0.646)	−0.060** (0.037)	−0.043 (0.510)
ATTNED	0.000 (0.547)	0.000 (0.868)	−0.000 (0.509)
LNINTA	−0.228 (0.682)	−0.101 (0.675)	−0.420 (0.491)
DIVTA	−3.745*** (0.004)	−1.678*** (0.001)	−2.377 (0.225)
PROVTA	−2.534* (0.069)	0.001 (0.999)	0.766 (0.586)
COUNTRY & TIME DUMMIES	YES	YES	YES
lambda	0.014 (0.761)		
Observations	654	654	654
Wald	25.84		
p value	0.077		
Rho	0.091		
Sigma	0.158		
R-squared		0.040	
F value		2.238	
F test allu = 0		1.107	
AR1			−3.095
p value			0.002
AR2			−0.478
p value			0.633
Hansen test			42.42
p value			0.910
Sargan test			78.47
p value			0.025

Note: The table contains the results of the regressions for the sample of banks with changes in composition only for the period 2003–2015. The dependent variable is abnormal returns (−20, +20). The independent variables are as follows: Chairman and CEO are the same person (CEOCH), Directors tenure (TIEDTINED), Executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), geographical origin executives (NATED), geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), Ln of interest income over total assets (LNINTA), dividend policy (DIVTA), and provisions over total assets (PROVTA). We have included the country and time dummy variables. The figure is the estimated value for the coefficient. In parentheses are the *p* values.

*Significant at 10% of the estimated coefficient.

**Significant at 5% of the estimated coefficient.

***significant at 1% of the estimated coefficient.

penalized more than increases, and the market assigns positive abnormal returns to increases in the number of non-executive directors. Investors seem to believe that the goal of those board reorganizations with changes in board composition and a larger number of non-executive directors is to increase the board's monitoring and advisory capabilities. Thus, adding independent directors to a bank board is perceived by the market as a contribution aimed at improving bank governance, as new board members are able to supervise executives without any constraints, besides contributing their expertise.

Having found abnormal returns in the announcements of changes in both board composition and size, we identified several variables that could explain these abnormal returns.

The existence of powerful CEOs contributes to increasing abnormal returns both when announcements are made that only change the composition of the board and when changes in size

TABLE 20 Regression results for the sample with changes in board size and only one event per bank and year

Abnormal returns	Changes in board composition		
Variables	**Heckman selection model**	**Fixed-effects regression**	**Panel-data estimation, two step system**
VPBZE	−0.210** (0.043)	−0.139*** (0.002)	−0.545*** (0.002)
CEOCH	0.302 (0.102)	0.068 (0.126)	0.030 (0.936)
TIEDTINED	−0.040** (0.029)	−0.021** (0.012)	0.007 (0.882)
EXEDED	−0.004 (0.437)	−0.001 (0.771)	−0.001 (0.900)
DTEDED	0.004 (0.755)	0.001 (0.847)	−0.013 (0.541)
AGEDNED	0.063 (0.239)	0.040 (0.103)	0.108 (0.140)
NATED	−0.008 (0.900)	0.006 (0.862)	−0.000 (0.998)
NATNED	−0.118** (0.045)	−0.085*** (0.009)	−0.229 (0.115)
ATTNED	0.000 (0.495)	0.000* (0.061)	−0.000 (0.801)
LNINTA	−0.459 (0.446)	−0.271 (0.363)	−0.548 (0.540)
DIVTA	−3.215** (0.014)	−2.399*** (0.000)	−2.224 (0.129)
PROVTA	−0.377 (0.779)	0.354 (0.452)	0.495 (0.759)
GSIBD	0.079** (0.014)	−0.009 (0.600)	0.013 (0.234)
GFCD	−0.066** (0.027)	−0.022* (0.064)	0.005 (0.684)
COUNTRY & TIME DUMMIES	YES	YES	YES
lambda	0.059 (0.236)		
Observations	706	706	706
Wald	54.06		
p value	0.001		
Rho	0.345		
Sigma	0.170		
R-squared		0.081	
F value		3.963	
F test allu = 0		0.985	
AR1			−3.172
p value			0.002
AR2			−1.022
p value			0.307
Hansen test			46.05
p value			0.739
Sargan test			48.86
p value			0.636

Note: The table contains the results of the regressions for the sample of banks with changes in composition and size for the period 2003–2015. The dependent variable is abnormal returns (−20, +20). The independent variables are as follows: Relative weight of new appointees in the board (VPBZE), Chairman and CEO are the same person (CEOCH), Directors tenure (TIEDTINED), Executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), geographical origin executives (NATED), geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), Ln of interest income over total assets (LNINTA), dividend policy (DIVTA) and provisions over total assets (PROVTA), dummy variable for G-SIB (GSIBD), and the dummy variable for the years of 2007–2008 financial crisis (GFCD). We have included the country and time dummy variables. The figure is the estimated value for the coefficient. In parentheses are the *p* values.

*Significant at 10% of the estimated coefficient.

**Significant at 5% of the estimated coefficient.

***Significant at 1% of the estimated coefficient.

are announced. That is, the average negative market reaction is moderate when the CEO and the chairman is one and the same person. When the CEO holds too much authority within the firm, misconduct is a potential outcome. Shareholders positively value changes in the board of directors that could mitigate the risk of misconduct.

If the announcement increases the size of the board and there is a strong presence of local directors, negative abnormal returns should be observed around the announcement date. Shareholders consider a large increase in board size to be negative for the market value of the bank because the new board will face higher costs and higher

TABLE 21 Probit results for the sample with changes in board composition and one event per year and bank

SCAMD	Changes in board composition
Variables	Random effects probit regression
CEOCH	−0.301 (0.611)
TIEDTINED	0.016 (0.871)
EXEDED	0.008 (0.649)
DTEDED	−0.030 (0.441)
AGEDNED	−0.290 (0.141)
NATED	−0.371 (0.261)
NATNED	0.447* (0.052)
ATTNED	−0.006*** (0.000)
LNINTA	0.008 (0.998)
DIVTA	4.365 (0.559)
PROVTA	2.440 (0.701)
ECD	−0.721*** (0.000)
GFCD	0.416*** (0.001)
MALNED	−0.223** (0.043)
COUNTRY & TIME DUMMIES	YES
lnsig2u	−12.050 (0.998)
Observations	654
Wald test	356.9
p value	0
Log pseudolikelihood	−372.1

Note: The table contains the results of the probit analysis for the sample of banks with changes in composition only for the period 2003–2015. The dependent variable is SCAMD that takes the value of 1 if the announcement of changes in board composition takes place and 0 otherwise. The independent variables are as follows: Chairman and CEO are the same person (CEOCH), Directors tenure (TIEDTINED), Executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), geographical origin executives (NATED), geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), 100% of non-executives are males (MALNED), Ln of interest income over total assets (LNINTA), dividend policy (DIVTA), provisions over total assets (PROVTA), banks headquartered in Eastern European countries (ECD), and 2007–2008 financial crisis (GFCD). We have included the country and time dummy variables. The figure is the estimated value for the coefficient, *p* value in parentheses.
*Significant at 10% of the estimated coefficient.
**significant at 5% of the estimated coefficient.
***significant at 1% of the estimated coefficient.

TABLE 22 Probit results for the sample with changes in board size and one event per year and bank

VCOD	Changes in board size
Variables	Random effects probit regression
VPBZE	−2.277*** (0.001)
CEOCH	−0.918** (0.037)
TIEDTINED	0.003 (0.976)
EXEDED	0.012 (0.567)
DTEDED	−0.101* (0.054)
AGEDNED	0.240 (0.261)
NATED	0.196 (0.426)
NATNED	0.336 (0.180)
ATTNED	−0.004** (0.015)
LNINTA	5.377* (0.053)
DIVTA	11.008 (0.169)
PROVTA	4.996 (0.357)
TD	−0.558** (0.031)
PG	−0.849** (0.011)
DLT	−0.279** (0.040)
MALNED	−0.165 (0.236)
COUNTRY & TIME DUMMIES	YES
lnsig2u	−15.852 (1.000)
Observations	706
Wald test	245.3
p value	0
Log pseudolikelihood	−411.2

Note: The table contains the results of the probit analysis for the sample of banks with changes in composition and size for the period 2003–2015. The dependent variable is VCOD that takes the value of 1 if the announcement of changes in board size and composition takes place and 0 otherwise. The independent variables are as follows: Chairman and CEO are the same person (CEOCH), relative weight of new appointees in the board (VPBZE), directors tenure (TIEDTINED), Executive directors experience (EXEDED), executive directors distraction (DTEDED), directors seniority (AGEDNED), geographical origin executives (NATED), geographical origin non-executives (NATNED), non-executives attrition in the last 3 years (ATTNED), 100% of non-executives are males (MALNED), Ln of interest income over total assets (LNINTA), dividend policy (DIVTA), provisions over total assets (PROVTA), one tier boards (TD), banks headquartered in large countries (PG), and delisted banks during the sample period (DLT). We have included the country and time dummy variables. The figure is the estimated value for the coefficient, *p* value in parentheses.
*Significant at 10% of the estimated coefficient.
**Significant at 5% of the estimated coefficient.
***Significant at 1% of the estimated coefficient.

coordination problems, and difficulties could arise affecting efficient supervision. In the same vein, larger boards could be related to desires of CEOs to accommodate local directors to facilitate their entrenchment. Furthermore, while changes in board size in Globally Systemically Important banks is viewed positively by stock market investors, the announcements of changes in board size during the great financial crisis deepened the negative abnormal returns around the event.

On the other hand, if the executive directors have more seniority than the non-executive board members, there is a positive market reaction around the announcement date in the form of higher abnormal returns. In the absence of further information about directors, their age becomes a proxy of their expertise and the bank's internal knowledge base.

Regarding financial variables, those banks with generous dividends and higher level of interest margin and provisions experience lower (negative) abnormal returns when they announce changes in

the composition and size of their board. In those banks with a high dividend yield and low risk, shareholders do not see reasons for changes in the board. Hence, any announcement of changes in the board goes against their perception that the bank is doing well and announcements of this kind produce a negative reaction on the part of those shareholders who would prefer to maintain the status quo. An alternative explanation for such negative reaction could be that the shareholders of banks doing well interpret the announcement of changes in board as a sign of problems ahead.

Finally, we enquire as to how to forecast whether a bank is willing to make announcements about changes in the composition and size of its board. A higher proportion of local non-executive directors increases the likelihood that a bank will make an announcement of changes in the composition of its board while maintaining the same size. Our results also let us conclude that announcements of changes in board composition are more likely during a period of crisis. On the other hand, when non-executives are all male or there is a high level of non-executive director attritions, the chances of announcing changes in the board's composition diminish. The likelihood of announcements regarding board composition changes are lower in banks from France, Greece, the Netherlands, and Spain.

A large increase in new appointees, greater distraction for executive directors, high attrition among non-executive directors, integrating CEO and Chairman in the same person and all male non-executive directors reduce the likelihood of an announcement to modify the size of the board. One-tier boards, banks from large countries, and banks in trouble show, also, lower probability of making announcements of changes in board size. Austrian banks are those less likely to announce changes in board size. However, in those banks with senior and experienced executives and a higher interest margin, the likelihood of making announcements of changes in board size is higher. Irish and British banks are those with most announcements of board size modifications.

Thus, investors identify changes in board composition as a cosmetic answer to bank problems, particularly when these changes increase the number of executives. Banks with powerful CEOs and more senior executives show higher abnormal returns when they announce changes in board size. However, banks with lower risk and high dividends experience a lower abnormal reaction on the market when they announce changes in their board composition. Banks with a generous dividend policy that announce changes in their board are not compensated by their shareholders via abnormal returns. A change of this kind is either not appreciated or negatively perceived by shareholders because they are satisfied with a dividend policy that could only get worse. On the other hand, banks with a high level of distraction among its executive directors and high attrition among non-executive directors are less likely to announce changes in board size. In other words, they have less time to consider board changes either because they are distracted by sitting on several boards or because they are worried about attrition.

Our final remark is that our research offers insights into improving the transparency and quality of the information provided by directors in their relation to bank stakeholders through board announcements. Policy-makers should consider introducing minimum requirements in announcements as signs for stakeholders to use to evaluate board effectiveness.

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All remaining errors are our sole responsibility.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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NOTES

[1] European cross-country studies on bank corporate governance are scarce when compared with the United States.

[2] Pathan and Faff (2013) argue that bank boards are key in achieving effective governance. Additional evidence can be found in the Fernandes et al. (2018) survey.

[3] We have taken the main stock index from the market where the bank is listed. However, if the bank is listed in more than one market, we have selected the country where it has its headquarters.

[4] See Table 1 for the list of market indexes.

[5] The variables with yearly information are affected by all the announcements in that year. For this reason, we generate a new group when there is more than one announcement in the same year for the same bank in order to avoid selection bias if we only considered the first announcement of each year. Banks with several announcements in the same year are particularly numerous when they inform about board size changes (33 out of 67). Nonetheless, we have repeated the empirical analysis with only one announcement per year and bank. The reader can find the robustness analysis in Section 6.1 when the sample only includes one event per year and bank.

[6] We acknowledge and give thanks to an anonymous referee for this suggestion.

[7] These are the Eastern European countries with banks in our sample.

[8] As explained in Section 3, the regression analysis does not include OLS estimations because they are inconsistent. Notwithstanding, the OLS estimations are available on request.

[9] The non-significance of directors' education in our study could be due to the difficulties in designing a variable to measure this characteristic.

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