



Corporate entrepreneurship and governance: Mergers and acquisitions in Europe

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ABSTRACT

Mergers and acquisitions (M&A) are a form of corporate entrepreneurship involving strategic decisions that require discussion and approval by the board of directors of the acquiring firm. We focus on board attributes to analyze the entrepreneurial function of the board of directors and its involvement in corporate entrepreneurship. Building on different theories (agency theory, resource dependence theory, stewardship theory, and stakeholder theory), we examine whether board composition affects the number of acquisitions, the risk involved in bids, and the creation of value for the acquirer's shareholders. For a sample of European firms over the period 2002 to 2020, we find that board size and the percentage of external directors are related to the number of acquisitions. However, neither the percentage of women on the board nor CEO duality affects the number of acquisitions by a given firm. We also show that more risky acquisitions are associated with larger firms with a lower proportion of women directors, whereas less risky transactions are related to smaller firms where the CEO is also the chair of the board. Finally, our results indicate that firm acquisitions create value for the acquiring firm and that the market reaction is positively related to board size and CEO duality.

1. Introduction

Mergers and acquisitions (M&A) are a form of corporate entrepreneurship consisting of capturing the assets and technology needed to achieve strategic objectives and corporate development. Intense global competition and rapid technological change have made the permanent renewal of competitive advantages necessary, forcing businesses to innovate (Benkraiem et al., 2021). As Christofi et al. (2019) have noted, firms often pursue global strategic partnerships, such as M&A, to enhance their technological capabilities and tap into the innovative potential of entrepreneurial organizations. Thomson and McNamara (2001) showed that by identifying valuable knowledge and capabilities of the target firm, corporate entrepreneurship plays an important role in the integration of M&A. Corporate investment in domestic and cross-border M&A allows firms to seek value for their operations in order to compete effectively in a dynamic and competitive business environment.

Encouraging corporate entrepreneurship in an organization requires an active role by the corporate board. A key function of the board of directors is to make strategic decisions that create value for the firm. As reported by Shane et al. (2003, p. 258), "the attributes of people making

decisions about the entrepreneurial process influence the decisions that they make." Therefore, factors such as board composition and directors' characteristics are important in this decision-making process.

Traditionally, the characteristics analyzed as factors affecting the effectiveness of strategic decisions are board size and director independence. However, in recent years, gender diversity has attracted academic and social interest as both a question of equality and a way of incorporating talent within a company.

This study focuses on an area that represents one of the most important strategic decisions of entrepreneurial companies and that offers growth opportunities, namely mergers and acquisitions (M&A). We analyze whether the composition of the board of directors affects the number of acquisitions made, the risk taken in these acquisitions, and the value created for the acquiring firm's shareholders. Unlike previous research, this study uses four dimensions to characterize the board of directors: board size, director independence, gender diversity, and CEO duality.

Analysis of the relationship between corporate board composition and acquisitions is of interest for two reasons. First, a corporate acquisition entails a strategic business decision with an uncertain outcome. Therefore, it can be defined as a managerial risk-taking action

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(Hoskisson et al., 2017). The literature describes the links between the creation of value for the acquiring firm's shareholders and the characteristics of both the companies involved and the deal itself (Martynova and Renneboog, 2008). However, the literature generally overlooks the behavior of corporate elites and the characteristics of the board of directors. Second, quota laws that seek equal participation by women and men at the top management level in many countries have led to changes in the gender composition of boards. The acknowledgment in the literature that women are more risk averse, more empathetic, and less overconfident than men suggests a need to investigate whether these behavioral differences are also present at the top management level and can therefore affect company strategy, particularly the market perception of the wealth created by the M&A process (Ahmed et al., 2022; Askarzadeh et al., 2022; Benkraiem et al., 2021; Chen et al., 2016; Dowling and Aribi, 2013; Huang and Kisgen, 2013; Levi et al., 2014; Rosca et al., 2020). The actions taken by the European Parliament, European Commission, and Council of Europe since 2007, ranging from legal instruments to voluntary schemes to narrow the gender gap in top corporate management, provide a unique opportunity to study the relationship between gender diversity and M&A in Europe. As Elgharbawy and Abdel-Kader (2016) have noted, the flexibility embedded in corporate governance codes provides a healthy environment for firms to pursue their corporate entrepreneurship.

The theoretical approach is based on the complementary proposals of agency theory (Jensen and Meckling, 1976) and stakeholder theory (Freeman, 1984). This approach is used to identify the characteristics that can improve the basic functions assigned to the board of directors, namely supervising and monitoring, avoiding opportunistic behavior by executives, and advising decision makers to improve their decision-making processes.

This study makes important contributions to the literature. First, it contributes to extending research on M&A by presenting a multi-country study of how the characteristics of the board of directors influence the M&A process. Second, the specific analysis of board gender diversity in M&A shows whether there are differences in behavior according to gender at the top management level as well as whether the participation of women in the decision-making process affects value creation. Third, the study enriches the existing evidence, which fundamentally focuses on the U.S. market, by covering the European market, where the European Union (EU) has implemented actions to promote changes in board composition. In addition, by studying other markets, we can check whether the conclusions reached for the U.S. market can be extrapolated to European markets.

Our results show that board size and the percentage of independent directors are both related to firm acquisitiveness but that each relationship is different. Board size is negatively associated with the number of acquisitions, whereas the percentage of independent directors has a positive relationship. However, neither the percentage of women on the board nor CEO duality affects the number of acquisitions by a given firm. We also show that more risky acquisitions are associated with larger firms with a lower proportion of women directors, whereas less risky transactions are related to smaller firms where the CEO is also the chair of the board. Finally, our results show a significant positive relationship between board size and value creation by bid announcements as measured by cumulative abnormal return (CAR). However, for gender diversity and board independence, no significant relationship is observed.

The remainder of the paper is structured as follows. Section 2 presents the literature review and hypotheses. Section 3 describes the sample and defines the variables used in the analysis. Section 4 explains the methodology. Section 5 presents and discusses the results. Section 6 concludes.

2. Literature review and hypotheses

In traditional corporate finance, the influence of directors on

decision making is largely ignored. The focus is on the firm and deal characteristics instead of managerial characteristics. Consequently, previous research has generally overlooked the impact of the composition of the acquirer's board on the M&A process.

The board of directors is the governing body that advises and monitors managers' decisions to ensure that decision making is subject to their approval. Consequently, the characteristics of the board and the attributes of its members are likely to affect the outcomes of the acquisition process.¹

Agency theory is the most prevalent approach to analyzing the relationship between the board of directors and corporate management. According to agency theory, one of the board's primary functions is monitoring managers to align their interests with those of shareholders and reduce agency costs (Fama and Jensen, 1983; Jensen and Meckling, 1976). Regarding M&A, an effective board provides the acquirer with advice, knowledge, and supervision to create value. Alternatively, stewardship theory advocates the existence of healthy working relationships between managers and shareholders, which help minimize the costs of supervision and control while increasing the speed of decision making and the autonomy of managers and executives. Thus, according to stewardship theory, managers seek to maximize company profits and bring high returns to shareholders (Donaldson and Davis, 1991).

According to resource dependence theory, the board provides resources to the firm through directors' human and relational capital (Pfeffer, 1973). Additionally, under stakeholder theory, the board of directors is believed to preserve the interests of not only shareholders but also all other stakeholders by aligning the goals of managers and stakeholders (Freeman, 1984; Hussain et al., 2018). From this perspective, board diversity leads to different points of view, sensibilities, and experiences, enhancing the board's effectiveness. Therefore, based on agency theory and stakeholder theory, we argue that certain board characteristics can shape bid initiation and enhance the creation of value by an M&A process. Next, we present the relevant research on each of the board characteristics considered in this study. The hypotheses tested in this study are also presented.

2.1. Board size

There is no consensus on the impact of board size on decision-making processes. Agency theory links larger boards with coordination and communication problems. As a result, larger boards are seen as less efficient and slower in decision making (Jensen, 1993). Moreover, Yermack (1996) showed that larger boards are associated with lower firm value than smaller boards because of increased information asymmetry and the difficulty of reaching a consensus. From the perspective of resource dependence theory, large boards, which capture more experience, more diverse knowledge, and greater volumes of information, are preferable and might be critical for value creation in M&A processes (Pfeffer, 1973).

Likewise, the empirical evidence on the effect of board size on the M&A process is mixed. Cheng (2008) noted that larger boards find it more difficult to reach a consensus. Consequently, larger boards are associated with less frequent M&A activity. Also, Kolasinski and Li (2013) argued that a medium-sized board is less prone to free riding and is likely to be more effective at attenuating the influence of CEO overconfidence on firm acquisitiveness. Cheng et al. (2008) observed that decreasing the board size is more valuable when the market for corporate control is more active.

¹ As far as we know, most of the existing evidence is for the U.S. market. The exceptions are the study by Dowling and Aribi (2013), which focuses on the UK market, and the study by Ahern and Dittmar (2012), which focuses on the Norwegian market. If the cited study focuses on the U.S. market, the country is not indicated in the text; otherwise, the specific market is stated.

However, previous evidence of the influence of board size on acquisitiveness is mixed, and other authors have reported different results. For example, Bugeja et al. (2012) and Masulis et al. (2007) found that the market reaction to bid announcements is not influenced by board size. On the contrary, Choi et al. (2019) observed that the likelihood of a large loss acquisition is negatively related to the number of directors. This latest evidence is in line with research by Lehn et al. (2009), who found that large boards of directors can offer better advice. Thus, when the complexity of the business increases, the board will try to add new directors with the relevant knowledge to provide guidance. Accordingly, Booth and Deli (1999), Coles et al. (2008), and Farag and Mallin (2019) have concluded that when the business is more complex, more advice is required, and this need for more advice is reflected by a larger number of directors. Defrancq et al. (2021) found a negative relationship between board size and the likelihood of takeovers and no relationship with acquirer returns.

Based on the above discussion, the lack of consensus on larger boards may negatively influence firm acquisitiveness. However, once an acquisition decision has been made, larger boards will provide better guidance and advice, resulting in a positive market reaction to the acquisition. Hence, the following hypotheses are formulated:

H1a. Board size and the number of announcements of acquisitions are negatively related.

H1b. Board size and the short-term market reaction to an acquisition are positively related.

2.2. Board independence

Independent directors are non-executive directors who are external to the organization. They can provide more objective advice than insiders, and they monitor the decisions by the firm's management, thereby preventing opportunistic behavior by managers and avoiding possible agency conflicts (e.g., Boone et al., 2007; García and Herrero, 2019).

Regarding acquisitiveness, Kolasinski and Li (2013) found that boards dominated by independent directors restrain acquisitions driven by CEO overconfidence. They argue that the figure of the independent director not only mitigates agency problems but also helps managers avoid honest mistakes. Continuing with this approach, according to Miletkov et al. (2015), firms involved in acquisition processes seek independent advisors to provide advice and identify potential acquisition targets through their formal and informal networks. These arguments support the findings of Choi et al. (2019), who observed that the likelihood of high-value acquisitions increases with the independence of the board, and Defrancq et al. (2021), who found a direct relationship between the percentage of independent directors and the likelihood of takeover and acquirer cumulative abnormal return (CAR).

However, as with board size, the results of previous studies are mixed. Masulis et al. (2007) did not observe a relationship between the independence of the board and acquirer returns. Nevertheless, Bugeja et al. (2012) noted the advantages and disadvantages of independent directors for acquisitiveness. Although they make more effective monitors, they involve higher information costs. In fact, it was observed that the relationship between board independence and market reactions to takeover announcements is negative and is explained by the fact that outside directors might be chosen less for their expertise in evaluating acquisitions than for their other duties. However, if independent directors focus on monitoring, it may limit their ability to contribute to an appropriate selection of target companies (Baldenius et al., 2014; Sundaramurthy and Lewis, 2003). The prevalent figure of an independent director to monitor managers' decisions leads to the formulation of the following hypotheses:

H2a. The proportion of independent directors on the board and the number of announcements of acquisitions are positively related.

H2b. The proportion of independent directors on the board and the short-term market reaction to an acquisition are positively related.

2.3. Gender diversity

The role of women in business has become increasingly prominent in recent decades. The enactment by numerous countries of quota laws that seek equal participation by men and women has undoubtedly helped women's access to management positions. Likewise, international organizations such as the EU and the United Nations (UN) have established goals aimed at achieving gender equality, highlighting the discrimination of women in certain areas and encouraging their fulfillment. In the EU, the European Commission set a binding minimum quota for female board members of 40 % by 2020. However, the proportion of women on major corporate boards in 2020 was much lower, with an EU28 average of 30 %.^{2,3}

Many authors have argued that greater gender diversity on corporate boards leads to different points of view, styles of communication, and experience, improving decision making and the board's effectiveness (e.g., Adams and Ferreira, 2009; Liao et al., 2015). Moreover, Erhardt et al. (2003) reported that the supervisory function may be more effective with diverse boards. Likewise, different studies have shown that women monitor activity more diligently and reduce agency costs (Adams and Ferreira, 2009), while greater board diversity helps align the objectives of managers and shareholders with those of stakeholders (Hussain et al., 2018). Rosca et al. (2020) showed that women favor inclusive strategies due to their more empathetic and emotional competencies. In contrast, other authors such as Hambrick et al. (1996) have observed that a more gender-diverse board can cause more discussions and conflicts due to a variety of opinions and may result in a less efficient decision-making process.

Some scholars have explained previous results in terms of the behavioral gender differences observed in the general population. Women are identified as being less overconfident and having a less risk-prone attitude than men (Croson and Gneezy, 2009). However, when extrapolating gender differences to leadership positions, the results are scarce and disparate. Although some authors have confirmed the less overconfident and less risk-taking stance of women (Faccio et al., 2016; Levi et al., 2014; Tate and Yang, 2015), others have shown that women in positions of responsibility and those involved in decision making do not fit with gender stereotypes (Adams and Funk, 2012; Deaves et al., 2008; Matsa and Miller, 2013).

In the field of M&A, the empirical results are mixed. Levi et al. (2014) found that participation by women on boards of directors creates value because of their influence on acquisition decisions. It was observed that higher percentages of female directors meant fewer acquisitions and lower bid premiums. Chen et al. (2016) showed an inverse relationship between the participation of women on the board and the number of acquisitions as well as the size of these acquisitions. Huang and Kisman (2013) showed that women managers make fewer but more profitable acquisitions than men. Dowling and Aribi (2013) found similar results and confirmed a negative relationship between the percentage of female directors and the number of acquisitions. However, they observed a significant negative relationship between board gender diversity and abnormal market returns. For Continental European firms, Defrancq et al. (2021) found that board gender diversity is unrelated to the

² Despite lying beyond the scope of this paper, a related indicator is the effectiveness of the application of "soft" gender quotas in Europe. For a discussion on this topic, see Mateos de Cabo et al. (2019). Fig. 1 nonetheless shows a steady increase in female participation on the boards of the European firms in our final sample.

³ Data from the European Institute for Gender Equality, Gender Statistics Database web page. https://eige.europa.eu/gender-statistics/dgs/indicator/wmidm_bus_bus_wmid_comp_compbm/datatable (last accessed May 10, 2022).

likelihood of takeovers but contributes to M&A value creation for the acquirer's shareholders. Benkraiem et al. (2021) found no relationship between the presence of women and the decision to adopt a corporate venture capital strategy.

Bugeja et al. (2012) observed no relationship between the gender diversity of the board and the premium paid or the reaction of the market to the announcement of the acquisition. Similarly, Ahern and Dittmar (2012) found that the companies in the Norwegian market that were most affected by the imposition of a gender quota made more acquisitions, although they did not observe an impact on value creation. In light of this evidence, the following hypotheses are formulated:

H3a. Gender diversity on the board of directors and the number of acquisition announcements are negatively related.

H3b. Gender diversity on the board of directors and the short-term market reaction to an acquisition are positively related.

2.4. CEO duality

Finally, the impact of CEO duality on the process of acquisition is also important. CEO duality means that the CEO and chair of the board are the same person. Under the perspective of agency theory, the accumulation of power when the CEO is also the chairperson suggests a weakening of board oversight and control (Morck et al., 1989). However, stewardship theory suggests that this accumulation of leadership may promote better and faster decisions (Sundaramurthy and Lewis, 2003).

Regarding acquisition processes, Bange and Mazzeo (2004) showed that bidders are less likely to negotiate the bid premium when the CEO is the chair of the board, so the likelihood that a takeover succeeds is higher if one person holds both positions. Bugeja et al. (2012) also highlighted the greater influence of the CEO on setting the bid premium when the same individual is the chair of the board. Ghazal (2015) found that dual-role CEOs act in the interest of their shareholders by bargaining 16.1 % more aggressively in takeover negotiations than single-role CEOs. For emerging markets, Pham et al. (2015) found a significant positive relationship between CEO duality and abnormal returns. However, it was also observed that both positions can help CEOs engage in empire building, so a negative relationship between CEO duality and the market reaction to acquisitions should be expected because of the higher likelihood of CEO entrenchment if the same person holds both positions. However, empirical support for this prediction is hard to find. Likewise, Masulis et al. (2007) showed that separating the positions of CEO and chair of the board makes CEOs more selective in their acquisition decisions and therefore creates more wealth for shareholders. Accordingly, the following hypotheses are formulated:

H4a. CEO duality and the number of announcements of acquisitions are positively related.

H4b. CEO duality and the short-term market reaction to an acquisition are positively related.

2.5. Risk in M&A decisions

The literature provides evidence of more risky investment by small boards (Wang, 2012), less risky financial behavior by independent directors (Dowling and Aribi, 2013), less risk-prone attitudes of women than men (Croson and Gneezy, 2009), and lower risk-taking propensity of firms with CEO duality (Kim and Buchanan, 2008). Given these characteristics, we also explored how the characteristics of the board are associated with the level of risk of the transaction because acquisitions can be considered risk-taking actions (Hoskisson et al., 2017).

Based on the available data, a risky acquisition is one in which the target firm belongs to a different industry and is located in a different country (i.e., the acquisition leads to industry and geographic diversification). On the contrary, a low-risk acquisition is one in which the

target firm belongs to the same industry and is located in the same country as the bidder. This classification is consistent with the literature (e.g., Capron and Shen, 2007; Comment and Jarrell, 1995; Healy et al., 1997; Martynova and Renneboog, 2011).

Studies have highlighted several difficulties with industry diversification. For instance, bidders face a higher likelihood of overvaluing targets outside their core business because their knowledge base of the target industry is lower (Balakrishnan and Koza, 1993) and because of bureaucratic rigidities between the bidding and target firms (Shin and Stulz, 1998). Moreover, firms involved in cross-border acquisitions are likely to experience difficulties because of regulatory and cultural differences between countries that may impede the integration of target companies (Conn et al., 2005; Moeller and Schlingemann, 2005). Despite the higher risk of cross-border M&A acquisitions, Christofi et al. (2019) highlighted their importance in triggering technological innovation. Accordingly, the following hypothesis is formulated:

H5. Riskier acquisitions are associated with smaller boards, a higher proportion of independent directors, lower gender diversity of the board, and the absence of CEO duality.

3. Method

3.1. Board characteristics and acquisition initiation

To explore the association between board characteristics and the initiation of an acquisition, we followed two different yet complementary strategies to test hypotheses H1a, H2a, H3a, H4a, and H5. We studied the relationship between the characteristics of the board of directors and the number of acquisitions initiated by firm i in year t , as well as the propensity of firm i to initiate at least one bid in year t . In both cases, we controlled for firm characteristics as per Byrd and Hickman (1992), Levi et al. (2014), Martynova and Renneboog (2008), and Shivdasani (1993). A country's M&A market is influenced by the legal business environment for investors (Ciobanu, 2015). Therefore, we also controlled for country, year, and industry fixed effects. Finally, because standard errors may be underestimated in panel data sets such as the one employed in this study, we computed standard errors clustered by firm (Petersen, 2009).

We first investigated the relationship between board characteristics and the initiation of an acquisition by running negative binomial regression. The corresponding expression is shown in Eq. (1).

$$\begin{aligned} \text{Log}(\text{Num.Bids}_{it}) = & \beta_0 + \beta_1 \text{Boardsize}_{it} + \beta_2 \text{Independents}_{it} + \beta_3 \text{Women}_{it} \\ & + \beta_4 \text{CEOduality}_{it} + \beta_5 \text{Size}_{it} + \beta_6 \text{ROA}_{it} + \beta_7 \text{Leverageratio}_{it} \\ & + \beta_8 \text{FCF/TA}_{it} + \beta_9 \text{CommonLaw}_{it} + \beta_{10} \text{GDP}_{it} + \varepsilon_{it}, \end{aligned} \quad (1)$$

where, for each firm i in year t , we computed the following groups of variables:

- *Num. Bids* is the number of acquisitions initiated.
- Variables related to the board of director characteristics: *Board size* is the total number of directors; *Independents* and *Women* are the percentages of independent and women directors to the total number of directors, respectively; *CEO duality* is a dummy variable that took the value 1 if the CEO was the chairperson of the board and 0 otherwise.⁴
- Variables related to financial characteristics: *Size* is the log of the total assets of the firm; *ROA* is the return on assets; *Leverage ratio* is the firm's leverage to total assets; *FCF/TA* is the free cash flow to total assets.

⁴ Therefore, an average close to 1 means that most firms in the final sample had a CEO who was also the chair of the board.

– Variables related to the country: *CommonLaw* is a dummy variable that denotes the legal origin of the company law or commercial code of the country where the firm is located. The variable took the value 1 if the origin was English common law and 0 if the origin was civil commercial law. *GDP* is the gross domestic product growth rate for year *t* corresponding to the European member state where the firm was located.

Second, we modeled the acquirer's propensity to acquire a firm as a function of the characteristics of the board of directors. Specifically, we used a logit model to estimate the likelihood of firm acquisition, as shown in Eq. (2).

$$\text{Log} \left(\frac{\pi(x_{it})}{1 - \pi(x_{it})} \right) = \beta_0 + \beta_1 \text{Board size}_{it} + \beta_2 \text{Independents}_{it} + \beta_3 \text{Women}_{it} + \beta_4 \text{CEO duality}_{it} + \beta_5 \text{Size}_{it} + \beta_6 \text{ROA}_{it} + \beta_7 \text{Leverage ratio}_{it} + \beta_8 \text{FCF} / \text{TA}_{it} + \beta_9 \text{CommonLaw}_{it} + \beta_{10} \text{GDP}_{it}, \tag{2}$$

where $\pi(x_{it})$ is the probability that firm *i* made at least one acquisition in year *t*, and $\frac{\pi(x_{it})}{1 - \pi(x_{it})}$ is the odds ratio. The independent variables are those employed in regression [1].

3.2. Estimation of abnormal returns of acquiring firms in the announcement period

To analyze the market reaction to the acquisition announcement, we employed the conventional event study method to compute abnormal return (AR) and cumulative abnormal return (CAR) in the short term. The event window was defined as an 11-day window centered on the day of the announcement (t_0-5, t_0+5). Under the hypothesis of market efficiency (Fama, 1970), a positive and statistically significant abnormal return suggests that the market evaluated the acquisition positively.

For an acquisition announcement to be included in the final sample of M&A active firms, we required no other acquisition announcement to exist in the 10 days before or after the event day (t_0). Application of this criterion yielded a sample of 2,395 acquisitions by 768 firms over the period 2002 to 2020.

Abnormal returns were computed with the *mean-adjusted model*. In this model, the expected return was calculated as an average daily return over the estimation window or “uncontaminated” interval, defined as a 100-day window (t_0-20, t_0-119). The daily abnormal return for each acquisition in the sample was measured as the difference between the observed daily return of the firm and the expected return. We tested the significance of the average abnormal returns with the conventional *t*-test.

Multivariate analysis of the relationship between abnormal returns around the acquisition announcement date and the characteristics of the board of directors was performed to test hypotheses H1b, H2b, H3b, and H4b. We followed the two-step estimation procedure described by Heckman (1979) because M&A involves managers' decisions rather than a random assignment, and the estimation may be subject to self-selection bias (Sha et al., 2020).

In the first step, we modeled the acquirer's propensity to acquire a target as a function of corporate board variables. Specifically, we used a probit model to estimate the likelihood of firm acquisition. In the second step, the cross-sectional return equation was estimated using the announcement-period abnormal return as a dependent variable by including the Lambda endogeneity bias control variable (i.e., the inverse of the Mills ratio) obtained from the choice equation in the first step. The coefficient for Lambda in the return equation captured the effects of unobserved variables on performance. According to Li and Prabhala

(2007), correcting for self-selection helps prevent biased estimators, as well as including and controlling for unobservable private information that influences corporate finance decisions.

The dependent variable was the CAR (t_0-1, t_0+1), and the independent variables were the board characteristics and a set of control variables that previous evidence has shown to be related to value creation for the bidder's shareholders. Specifically, we controlled for the following characteristics:

- For the acquirer: *size*, *ROA*, and *leverage ratio* (defined above).
- For the deal: *industry diversification* (a dummy variable that took the value 1 when the target firm was not in the same industry as the

acquirer and 0 otherwise); *cross-border* (a dummy variable taking the value 1 if the acquisition led to geographic diversification and 0 otherwise); *prior stake* (percentage of target firm capital held by acquiring firm prior to the acquisition); *listed target firm* (a dummy variable taking the value 1 if the target firm was listed and 0 otherwise).

- For the country: *Common law* and *GDP* (defined above).

4. Sample data and variable definitions

The initial sample consisted of all non-banking firms headquartered in the EU publicly listed in any of the EU member states between 2002 and 2020.⁵ For firm *i* to remain in the final sample in year *t* ($2002 \leq t \leq 2020$), the following firm-level data were required:

- Board characteristics: number of directors, number of women directors, number of independent directors, and CEO duality.
- Financial characteristics: market capitalization, total assets, return on assets (ROA), leverage, and free cash flow.⁶

Application of these criteria yielded a final sample of 12,728 firm-

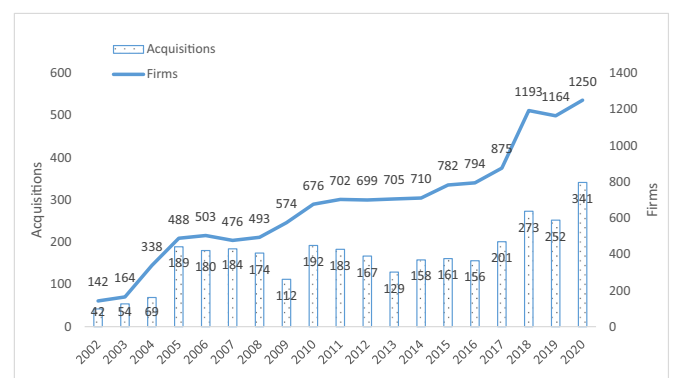


Fig. 1. Time profile of the total firms and number of acquisition announcements from 2002 to 2020.

⁵ Consequently, we considered UK listed firms in our sample.

⁶ We also required firm *i* in year *t* to have non-negative book value of equity.

Table 1
Number and weight of firm-year observations and total number of acquisition announcements from 2002 to 2020 by country.

	Firm-year observations		Acquisition announcements	
Austria	221	1.74 %	82	2.55 %
Belgium	419	3.29 %	83	2.58 %
Cyprus	23	0.18 %	9	0.28 %
Czech Republic	35	0.27 %	8	0.25 %
Denmark	371	2.91 %	54	1.68 %
Finland	439	3.45 %	94	2.92 %
France	1444	11.35 %	581	18.06 %
Germany	1221	9.59 %	251	7.80 %
Greece	208	1.63 %	27	0.84 %
Hungary	38	0.30 %	13	0.40 %
Ireland (Republic of)	409	3.21 %	110	3.42 %
Italy	627	4.93 %	212	6.59 %
Luxembourg	163	1.28 %	57	1.77 %
Malta	14	0.11 %	3	0.09 %
Netherlands	660	5.19 %	188	5.84 %
Poland	220	1.73 %	49	1.52 %
Portugal	132	1.04 %	19	0.59 %
Spain	587	4.61 %	174	5.41 %
Sweden	978	7.68 %	343	10.66 %
United Kingdom	4519	35.50 %	860	26.73 %

Table 2
Number of firm-year observations and total number of acquisition announcements from 2002 to 2020 by industry.

	Firm-year observations	Acquisition announcements
Accommodation and food services	296	2.27 %
Administrative, support, waste management and remediation services	383	2.94 %
Agriculture, forestry, fishing and hunting	26	0.20 %
Arts, entertainment, and recreation	107	0.82 %
Construction	705	5.41 %
Educational services	2	0.02 %
Finance and insurance	703	5.39 %
Health care and social assistance	88	0.67 %
Information	1295	9.93 %
Manufacturing	4851	37.20 %
Mining, quarrying, and oil and gas extraction	575	4.41 %
Other services (except public administration)	69	0.53 %
Professional, scientific, and technical services	783	6.00 %
Real estate and rental and leasing	862	6.61 %
Retail trade	805	6.17 %
Transportation and warehousing	580	4.45 %
Utilities	566	4.34 %
Wholesale trade	346	2.65 %

year observations for 1,832 non-banking firms.⁷ Data were gathered on acquisition bids initiated by the firms in the final sample between 2002 and 2020. Like Chang (1998), Faccio et al. (2006), and others, we required any acquisition included in the final sample to be a completed control acquisition. We defined a completed control acquisition as one in which the acquirer increased its ownership position to >50 %, regardless of the percentage of the target firm's shares previously owned by the acquirer. We thus identified 3,217 completed control acquisitions.

Fig. 1 shows the time profile of the number of acquirers in the sample and the number of acquisition announcements made each year. Note that the number of acquisitions was relatively low until 2004 and then

⁷ As noted by Defrancq et al. (2021), firms in the financial services are subject to specific regulations, and their annual reports are compiled under different accounting standards.

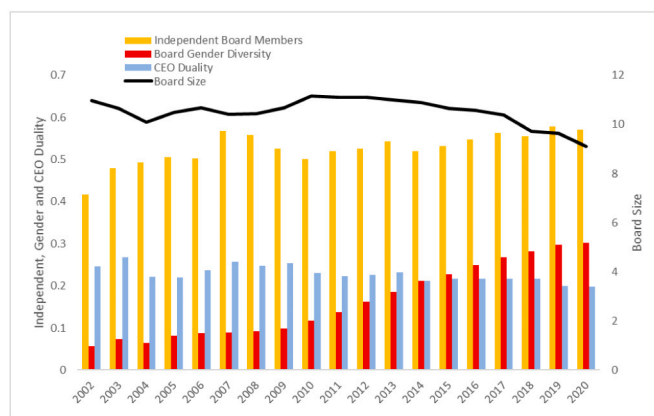


Fig. 2. Time profile for the characteristics of the board of directors.

rapidly increased until 2008. Despite a fall in the number of transactions during the years of the financial crisis, in more recent years, there was a notable increase in both the number of companies and the number of transactions analyzed.

Table 1 shows the number of firm-year observations and the total number of acquisition announcements by country. The firm-year observations from the UK represented about 35 % of the total observations in the sample. The UK was followed by France and Germany, with 11.3 % and 9.6 % of observations, respectively. The UK also had the highest percentage of acquisition announcements in the sample, with 26.7 %. France had 18 % of the announcements. Sweden (10.6 %) had the third highest percentage, ahead of Germany (7.8 %).

Table 2 shows the number of firm-year observations and the total number of acquisition announcements by industry. Manufacturing represented about 37 % of all observations, followed by Information (9.9 %) and Real State and Rental and Leasing (6.6 %).

Data on financial and board characteristics were retrieved from the Thomson Financial and Thomson Financial ESG databases. Stock market data were taken from the Datastream database.

Fig. 2 shows the time profile for the board characteristic variables for the final sample. The percentage of women on the board of directors rose considerably from an average of 5 % in 2002 to 30 % in 2020. The progressive incorporation of women in leadership positions in recent years, especially since 2010, suggests compliance with gender quota guidelines (whether legally binding or not) in Europe.

Table 3 shows the descriptive statistics for the full sample of 12,728 firm-year observations and firms involved in an acquisition (M&A active firm) or not involved in any acquisition (M&A inactive firm) at any point during the study period. Panel A in Table 3 shows the descriptive statistics for variables relating to board characteristics. The average board size was 10.37 members, of which 19.7 % were women and 53.9 % were independent directors. About 22 % of the CEOs were also the chairs of their boards. Comparing board characteristics between firms that made an acquisition in year *t* and those that did not shows that active firms had significantly larger boards, higher ratios of independent directors, and more dual-role CEOs than non-acquiring firms. However, the ratio of women on the board did not differ significantly between active and inactive firms. Regarding financial characteristics, Panel B of Table 3 shows that active firms were (on average) bigger, were more profitable (ROA), and generated greater free cash flows than inactive firms. However, there were no significant differences between active and inactive firms in terms of leverage.

5. Results

5.1. Board characteristics and acquisition initiation

Table 4 shows the results for regressions [1] and [2]. Mirroring the

Table 3

Descriptive statistics of board and financial characteristics for the full sample and firms involved in an acquisition (M&A active firm) and those not involved in an acquisition (M&A inactive firm) at any point during the study period.

	Full sample				M&A inactive	M&A active	Diff. test p value (1) vs (2)
	Mean	Max	Min	Std. Dev.	Mean (1)	Mean (2)	
Panel A: board characteristics							
Board size	10.373	29.000	2.000	3.817	10.268	10.868	0.000
Independent	0.539	1.000	0.000	0.238	0.535	0.558	0.000
Women	0.197	0.800	0.000	0.146	0.198	0.195	0.426
CEO duality	0.222	1.000	0.000	0.416	0.218	0.241	0.000
Panel B: financial characteristics							
Size	9.602	12.045	6.678	0.718	9.553	9.786	0.000
ROA	0.050	0.388	-0.296	0.070	0.048	0.055	0.000
Leverage ratio	0.251	0.747	0.000	0.161	0.251	0.248	0.525
FCF/TA	0.014	0.413	-0.491	0.067	0.013	0.019	0.001

Notes: The full sample consisted of 12,728 firm-year observations, where 10,511 were firm-year observations of M&A inactive firms and 2,217 were firm-year observations of M&A active firms.

Table 4

Negative binomial and logit model regressions.

Variables	Negative binomial regression			Logit model regression		
	All firms	Only active firms		All firms	Only active firms	
		Non-diversifying acquisitions	Diversifying acquisitions		Non-diversifying acquisitions	Diversifying acquisitions
Board size	-0.021 (0.063)	-0.02 (0.331)	-0.006 (0.665)	-0.023 (0.040)	-0.023 (0.360)	-0.011 (0.616)
Independent	0.380 (0.024)	0.488 (0.159)	0.249 (0.123)	0.284 (0.043)	0.126 (0.734)	0.393 (0.150)
Women	0.349 (0.276)	0.532 (0.345)	-0.965 (0.008)	0.053 (0.849)	-0.092 (0.891)	-1.182 (0.025)
CEO duality	-0.129 (0.119)	0.421 (0.004)	-0.159 (0.119)	-0.084 (0.308)	0.466 (0.013)	-0.196 (0.212)
Size	0.438 (0.000)	-0.428 (0.002)	0.185 (0.015)	0.530 (0.000)	-0.375 (0.014)	0.314 (0.016)
ROA	2.276 (0.000)	-0.775 (0.666)	0.962 (0.267)	1.903 (0.003)	-0.513 (0.760)	0.660 (0.623)
Leverage ratio	-0.073 (0.754)	0.261 (0.557)	-0.552 (0.072)	-0.258 (0.279)	0.181 (0.728)	-0.975 (0.043)
FCF/TA	0.637 (0.353)	2.425 (0.125)	1.455 (0.119)	-0.102 (0.879)	1.287 (0.388)	2.076 (0.106)
Common law	-0.701 (0.000)	1.328 (0.008)	0.263 (0.226)	-0.887 (0.000)	1.239 (0.032)	0.235 (0.490)
GDP	2.437 (0.058)	4.242 (0.170)	0.329 (0.836)	2.278 (0.143)	2.834 (0.483)	0.103 (0.971)
Intercept	-5.309 (0.000)	1.642 (0.205)	-3.340 (0.000)	-5.805 (0.000)	2.112 (0.166)	-4.016 (0.001)
Pseudo R ²	0.036	0.035	0.053	0.053	0.122	0.114
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Cluster(firms)	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors were estimated controlling for year, industry, country, and cluster by firm. The p value for each coefficient is reported in parentheses. The full sample consisted of 12,728 firm-year observations, where 2,217 were firm-year observations from M&A active firms.

findings reported by Cheng et al. (2008) for the U.S. market, the results show that the number of acquisitions performed by a firm is significantly negatively associated with the size of the board. We also observed a positive relationship between the number of acquisitions and the percentage of independent directors. This result coincides with those reported by Defrancq et al. (2021) for Continental Europe. However, the other board characteristic variables are not statistically significant. Given the results for the control variables, Table 4 also shows that a high number of acquisitions is linked to larger and more profitable firms. These characteristics of the bidding firm encourage managerial opportunism as a driver of acquisition decisions (Capron and Shen, 2007; Feito-Ruiz et al., 2014; Jensen, 1986; Roll, 1986). Regarding the country control variables, we observed that the number of acquisitions

performed by a company is positively related to GDP and is greater in countries with civil law. This finding may be due to the stronger investor protection in common law countries (Corredor et al., 2013; La Porta et al., 1998).

When studying the propensity to acquire a firm, we observed that the probability of bidding significantly decreases with board size and increases with the independence of the board. Regarding the control variables, the propensity to acquire a firm increases with the bidding firm size, and ROA is greater in countries with civil law. Consequently, except for GDP, we observed analogous results regardless of the approach. Therefore, our results support hypotheses H1a and H2a but fail to support hypotheses H3a or H4a. Our evidence suggests (i) that larger boards may be affected by coordination difficulties and suffer

from a lack of consensus, which leads to less frequent acquisition activity, and (ii) that companies involved in M&A processes require more advice and contacts to identify target companies, a task that is predominantly performed by independent directors. Nevertheless, neither the proportion of women on the board nor CEO duality appears to be related to acquisitiveness. Regarding women, the results reflect those of [Benkraiem et al. \(2021\)](#), who found no significant relationship between the presence of women and the adoption of a corporate venture capital decision.

Regarding the risk in M&A decisions, [Table 4](#) shows the results of a simple experiment by splitting the sample into two groups: acquisitions made within the same industry and country (non-diversifying acquisitions) and bids involving an inter-industry and cross-border deal (diversifying acquisitions). With this classification, we assumed that diversifying acquisitions are riskier than non-diversifying acquisitions. [Table 4](#) shows that bidders that made diversifying acquisitions were larger and had a lower proportion of women directors. These results are consistent with those of [Ahmed et al. \(2022\)](#). In contrast, bidders that made non-diversifying acquisitions were smaller and had CEOs who were also the chair of the board. These results are consistent when considering either the number of acquisitions initiated or the probability of initiating a bid. Therefore, the results partially support hypothesis [H5](#).

Our evidence suggests that initiating transactions that involve greater information asymmetry, search costs, and valuation difficulties (i.e., cross-border acquisitions outside the bidding firm's core business) requires a level of resources that is only accessible to large firms. In addition, both the number and probability of diversified acquisitions are significantly and negatively related to gender diversity, showing that women are more risk averse, less overconfident, and less likely to engage in this type of transaction. Similarly, less complex and less risky acquisitions are mainly made by smaller firms with CEO duality. This result is consistent with those reported by [Kim and Buchanan \(2008\)](#), who found that firms with CEO duality have significantly lower levels of risk-taking propensity.

5.2. Abnormal returns for acquiring firms around acquisition announcement

[Table 5](#) shows that average abnormal returns are positive and significant around the announcement date, regardless of the length of the event window (Panel B). Positive abnormal returns are strongest on the announcement date and the day after the announcement (0.276 % and 0.253 %, respectively) and are statistically significant at 1 % (Panel A). Therefore, investors view acquisitions as a value-creating transaction.

To link the corporate board characteristics to value creation on the acquisition announcement date, we performed multivariate analysis. [Table 6](#) shows the results from the multivariate OLS regressions. The dependent variable is the CAR ($t_0-1, t_0 + 1$), and the independent variables are the board characteristics and the control variables described in the [Method section](#).

Table 5
Abnormal and cumulative abnormal returns around the acquisition announcement day (t_0).

Panel A: Abnormal return (AR)											
	t0-5	t0-4	t0-3	t0-2	t0-1	t0	t0 + 1	t0 + 2	t0 + 3	t0 + 4	t0 + 5
AR (%)	0.000	-0.037	-0.005	-0.023	0.059	0.276	0.253	0.091	-0.043	-0.075	0.026
(p value)	(1.000)	(0.386)	(0.886)	(0.570)	(0.130)	(0.000)	(0.000)	(0.038)	(0.264)	(0.044)	(0.543)

Panel B: Cumulative abnormal return (CAR)						
	(t0-5, t0 + 5)		(t0-2, t0 + 2)		(t0-1, t0 + 1)	
CAR (%)	0.523		0.657		0.588	
(p value)	(0.000)		(0.000)		(0.000)	

Notes: We tested the significance of average abnormal returns with the conventional t-test. The sample consisted of 2,537 acquisition announcements by 768 firms.

Table 6
The association between acquisition announcement three-day CAR and board characteristics.

		MCO Regression CAR (t0-1, t0 + 1)			
Board variables	Board size	0.001 (0.005)	0.001 (0.004)	0.001 (0.005)	0.001 (0.004)
	Independent	-0.004 (0.505)	-0.004 (0.455)	-0.004 (0.477)	-0.004 (0.431)
	Women	-0.010 (0.313)	-0.010 (0.280)	-0.010 (0.310)	-0.010 (0.278)
	CEO duality	0.005 (0.093)	0.005 (0.078)	0.005 (0.089)	0.005 (0.075)
Firm control variables	Size	-0.018 (0.000)	-0.017 (0.000)	-0.018 (0.000)	-0.018 (0.000)
	ROA	-0.048 (0.049)	-0.051 (0.035)	-0.050 (0.041)	-0.053 (0.03)
	Leverage ratio	0.015 (0.057)	0.015 (0.059)	0.015 (0.056)	0.015 (0.058)
Deal control variables	Cross-border		-0.001 (0.527)		-0.001 (0.520)
	Industry diversification		0.001 (0.602)		0.001 (0.588)
	Prior stake		0.005 (0.229)		0.005 (0.232)
	Listed target firm		-0.006 (0.035)		-0.006 (0.037)
	Common law			0.018 (0.032)	0.020 (0.019)
Country control variables	GDP			-0.047 (0.605)	-0.041 (0.649)
	Imr	-0.044 (0.015)	-0.048 (0.008)	-0.046 (0.011)	-0.050 (0.006)
	Intercept	0.207 (0.000)	0.207 (0.000)	0.215 (0.000)	0.214 (0.000)
	R ²	0.041	0.044	0.041	0.044
	Year	Yes	Yes	Yes	Yes
	Industry	Yes	Yes	Yes	Yes
	Country	Yes	Yes	Yes	Yes
Cluster (firm)	Yes	Yes	Yes	Yes	

Notes: Standard errors were estimated controlling for year, industry, country, and cluster by firm. The p value for each coefficient is reported in parentheses. The sample consisted of 2,395 acquisition announcements by 768 firms.

The results in [Table 6](#) suggest that board characteristics are related to the market reaction to bid announcement. Acquirer returns are positively related to board size, suggesting that larger boards provide a greater volume of information and knowledge, resulting in better M&A decisions. This result is consistent with those of authors who emphasize the importance of guidance from directors in complex businesses ([Coles et al., 2008](#); [Lehn et al., 2009](#)). Like those of [Pham et al. \(2015\)](#), our results reveal a positive relationship between acquirer returns and CEO duality, thus reinforcing the arguments of stewardship theory.

The other board variables (i.e., gender diversity and independence) have no relationship with abnormal acquirer returns. The results coincide with those of [Ahern and Dittmar \(2012\)](#) and [Bugeja et al. \(2012\)](#)

regarding gender diversity and are consistent with those of Bugeja et al. (2012) and Masulis et al. (2007) regarding independence. Overall, our results confirm hypotheses H1b and H4b and lead to the rejection of hypotheses H2b and H3b.

All firm control variables are significant. Table 6 shows that abnormal returns are significantly negatively related to acquirer size and ROA. These results are consistent with previous literature that documents a size effect on the acquirer's stock returns whereby larger bidders get lower abnormal returns (Moeller et al., 2004). Moreover, abnormal returns were found to be significantly positively related to leverage ratio, indicating that investors seem to see the leverage of bidding firms as a corporate control mechanism (Farinós Viñas et al., 2017).

The only significant deal-related control variable is whether the target company is listed or unlisted. As expected, abnormal returns are significantly higher for acquisitions of unlisted firms (Farinós Viñas et al., 2017; Martynova and Renneboog, 2011; Petmezas, 2009).

Regarding the country control variables, abnormal returns are greater in common law countries, where there is evidence of stronger shareholder protection (Corredor et al., 2013; La Porta et al., 1998). These results hold regardless of which model is analyzed (Table 6).

6. Conclusions

The board of directors is a corporate governance mechanism that plays a decisive role in corporate entrepreneurship and therefore in M&A. Using data on acquisitions for a sample of 12,728 firm-year observations and 2,217 bids initiated by European firms between 2002 and 2020, we show that firm acquisitiveness is negatively associated with board size and positively associated with board independence. Within an agency theory framework, this result suggests that larger boards suffer from coordination problems and a lack of consensus, which leads to a lower frequency of acquisitions. Moreover, companies involved in M&A processes require independent directors who can provide monitoring, advice, and a network to assist in the identification of target companies. However, neither the percentage of women on the board or CEO duality affects the number of acquisitions by a given firm. The results regarding female representation on boards are especially relevant today, at a time when some countries are imposing mandatory board gender quotas. The results also support previous evidence regarding M&A in that a greater number of acquisitions is associated with larger firms, suggesting management opportunism.

A deeper analysis of the level of risk associated with these transactions confirms that more risky acquisitions are associated with larger firms with a lower proportion of women directors, suggesting that women directors are more risk averse than male directors. In contrast, less risky transactions are linked to smaller firms where the CEO is also the chair of the board, indicating that firms with CEO duality have lower levels of risk-taking propensity. Therefore, the results support the existing evidence of the less risk-seeking attitude of women than men.

The evidence implies that this type of transaction brings value to the acquiring company and that the market reaction is related to certain characteristics of the board of directors. Board size and CEO duality are positively related to market reactions to bid announcements. Overall, larger boards are observed to bring more information, knowledge, and experience. Regarding CEO duality, the results support the hypothesis of stewardship theory, according to which CEO behavior maximizes a company's profits and provides attractive returns to shareholders.

Our study provides a better understanding of how the composition of the board of directors influences M&A processes. It reveals that board composition can affect the number of transactions, the risk of those transactions, and the value created. Hence, the results are of interest to policymakers, who make recommendations for good governance and transparency; to managers, who ultimately design the composition of boards; and to investors, who seek economic efficiency and confidence.

Given the value of our results, we believe that this line of research should be extended to investigate how human factors such as board

members' age, professional background, and educational level affect entrepreneurial motivation. Another interesting aspect to address in future research would be the role of gender quotas (soft versus mandatory) in the decision-making process.

CRedit authorship contribution statement

We the undersigned declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We understand that the Corresponding Author is the sole contact for the Editorial process. He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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