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The pathways of board diversity in European contexts: Exploring the influence of director types on firm performance ☆

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ABSTRACT

This research paper explores the impact of board diversity on firm performance, with a particular focus on different types of board members. The study examines gender, age, tenure, education, and nationality diversity among board members for their effects on firm performance. Using a multi-country dataset and various performance proxies, the paper employs panel regression analysis to assess the relationships. The findings reveal nuanced effects of diversity, with gender diversity among independent and non-executive directors, age diversity among executive directors, and education diversity among executives showing positive impacts. The dominant pathway among these effects is the strategic role of directors, as suggested by the resource dependence theory. However, the paper also highlights the inappropriateness of a one-size-fits-all approach to board diversity, which can have either positive or negative effects depending on the context. Overall, the research contributes to the understanding of board diversity and its implications for corporate governance and firm performance.

1. Introduction

The subject of board diversity and its link with firm performance has given rise to a large body of literature that has been closely examined in recent times. Board gender diversity, in particular, has attracted a great deal of institutional and political attention. Various recent recommendations for business administration improvements expressly highlight the significance of gender differences on boards of directors. The most stringent diversity requirements operate in Norway, where, since January 2008, all registered companies must include 40 % female directors or face closure (Bøhren and Staubo, 2016). In some parts of Europe, legal measures to promote board diversity are already in place or imminent. Sweden has threatened willfully non-compliant companies with the legal enforcement of a 25 % gender quota (Miller and del Carmen Triana, 2009; Singh and Vinnicombe, 2006).

This public and institutional concern will probably extend to other types of diversity, such as ethnic or age diversity. At the very

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least, this reflects a general interest in achieving diversity and aspiring to its implementation in all contexts, including board rooms.

The purpose of this article is to clarify the relationship between board diversity and firm performance. The key question is whether there is an underlying economic motive in this encouragement of diversity. It could be argued, as pointed out by Carver (2002), that the object of business is not just to maximize shareholder value but also to protect stakeholder interests. Linked to the stakeholder theory is the idea that the running of a business carries with it an intrinsic moral obligation. The underlying notion is that board duties may stretch to include loyalty to stakeholders. Thus, diversity awareness in society, seen by firms as a key stakeholder with valid interests, suggests legitimate reasons for the promotion of diversity irrespective of the impact on firm performance, which could be non-significant or even negative. However, the stakeholder perspective could undermine the prime objective of private enterprise, whose *raison d'être*, unlike that of the public sector, is value creation. Hart and Zingales (2022) even propose shareholder welfare maximization as an explanation for the recent behavior of shareholders, who, moved by their own commitment to social and environmental issues, have pushed companies to act in ways that might reduce market value.

Regardless of the above, and even with the prioritization of stakeholder interests, the issue remains relevant. If diversity enhances, or at the very least does not damage firm performance, it would not only be the most moral and "proper" way to act but also the most profitable one.

Whereas most of the literature highlights the effect of diversity in single-country studies, this paper studies its effects on firm performance in a multi-country sample. The current literature on the topic is characterized by great ambiguity and conflicting findings. Given that diversity is heavily reliant on context (Post and Byron, 2015), which, as will be discussed, is one of the reasons behind the ambiguity of related research findings, we believe that this study could shed some light by considering a broad sample of countries with their own contexts and idiosyncrasies.

As will be highlighted later in more detail, there are two competing theories to account for the potentially positive impact of board diversity on firm performance: Resource dependence theory and agency theory. This is the first study showing a way to identify the main causal path for the diversity effect, by making a distinction between types of directors, such that the analysis considers executive directors (whose principal, albeit not exclusive, function is strategic management); non-executive directors (whose role is mainly supervisory); and independent directors (who perform both roles).

Our main contribution to the literature on board diversity and corporate governance is to provide a tool to clarify the link between diversity and firm performance by considering different director types. This is crucial in the context of the conflicting findings reported in the current literature on the topic. At the same time, this is, to the best of our knowledge, the first paper to differentiate board diversity effects by director type in a multi-country framework. Meanwhile, comparing the virtues of each framework, the results for our sample, which includes the main countries of Europe, show that the resource dependence model has more power to explain the positive effect of board diversity. This might suggest that it is chiefly through the board's strategic function that diversity affects performance. However, the evidence does not rule out the possibility that diversity (particularly in gender form) may also operate through the enhancement of monitoring capabilities. Also, while most papers check only for a linear relationship, we find evidence to support a non-linear U-shaped relationship (particularly on gender and age), which is consistent with critical mass theory.

Our results reveal a positive effect for diversity in gender, age and educational discipline (breadth of education). Diversity in educational attainment (depth of education), tenure and nationality appear to have a negative effect. However, as will be detailed later, these results, and consequently the pathway of the effect, will differ according to the type of director being considered.

The paper is structured as follows. Section 2 contains a discussion of the theoretical framework with an outline of the two main academic theories on the subject, the empirical evidence to date and reasons for the disparity in the results reported in the literature, and it concludes with the formulation of the hypotheses. Section 3 describes the methodology and defines the variables. The results are presented in Section 4 and discussed in Section 5, where the limitations of this work are acknowledged and potential future research opportunities are outlined.

2. Theoretical framework

2.1. Literature review

The term "board diversity" refers to a variety in specific attributes that can be defined by observable criteria such as nationality, age, gender and also by less visible criteria such as the educational, functional, and occupational backgrounds of board members (Goodstein et al., 1994; Kang et al., 2007; Kilduff et al., 2000; Maznevski, 1994; Milliken and Martins, 1996; Pelled, 1996; Petersen, 2000; Timmerman, 2000; Watson et al., 1998).

Although great effort has been spent on studying board diversity and its link with firm performance in the last decades, little is yet known about it. As will be shown, most of the theoretical speculation points to a positive effect on performance. Even so, the volume of conflicting findings clearly signals the need for further research to clarify the nature of the relationship.

Throughout this section, we outline the mechanisms by which board diversity can influence firm performance, by examining the main theories used by scholars to explain their empirical findings. We then address the ambiguity in existing findings, explore the possible underlying causes and discuss the measures that we will implement to address this issue which may prove to have been a long-standing stumbling block in the research on the relationship between diversity and performance.

The first theory broadly studied in the literature and very commonly used by corporate governance scholars is the agency theory (Panda and Leepsa, 2017; Fama and Jensen, 1983; Hart, 1995; Jensen and Meckling, 1976), according to which the board of directors plays a monitoring role, helping to achieve an alignment of interests between the firm's owners and its managers, who might otherwise prioritize their own interests. There are various reasons to suppose that a more diverse board will be better at monitoring. Diversity

fosters independent thinking in the boardroom, which can make monitoring more effective (Adams and Ferreira, 2009; Adams et al., 2015). Moreover, while mutual criticism is unlikely in a homogeneous boardroom, conflict tends to arise in a diverse one ultimately increasing board independence and thereby improving monitoring capabilities. Thus, Carter et al. (2010) emphasizes that boards with members of diverse backgrounds are more independent and consequently better at monitoring. Although the agency theory links diversity with better capabilities and predictable performance gains, this link is not strong (Carter et al., 2003). High percentages of ownership held by the board might be a stronger monitoring mechanism than board independence or diversity (Jensen, 1993; Monks and Minow, 2004).

The resource dependence theory provides more compelling arguments supporting positive outcomes from diversity. According to Carter et al. (2010) "Resource dependence theory provides the basis for some of the most convincing theoretical arguments for a business case for board diversity". Under this theoretical lens, the board is viewed as a link between the firm and its environment, from which it obtains the necessary resources for survival and growth, thereby creating a dependence between the firm and external units (Terjesen et al., 2009).

The resource dependence perspective highlights several facets of the diversity-performance relationship. Firstly, a heterogeneous board provides the firm with unique information, which aids decision-making (Ali et al., 2014; Carter et al., 2010), helps to achieve a better understanding of diverse customer segments, and promotes internationalization (Fernández-Temprano and Tejerina-Gaite, 2020), while a variety of perspectives stimulate innovation (Cox and Blake, 1991; Robinson and Dechant, 1997). Secondly, a diverse board has more possibilities of access to key stakeholders and is more likely to secure their interests (Berman et al., 1999; Fryxell and Lerner, 1989), thereby signaling to the market the firm's stakeholder orientation and social responsibility (Ibrahim and Angelidis, 1995; Oakley, 2000; Webb, 2004; Reguera-Alvarado et al., 2017). Thirdly, diverse boards attract a varied pool of talent (Spence, 1973) and enhance corporate legitimacy, particularly in diverse societies (Carter et al., 2010), thus promoting cross-cultural sensitivity and internationalization.

The agency and resource dependence theories coincide in predicting benefits for firms who have more diverse boards. Of course, all these positive effects of board diversity come with a price, another aspect of the diversity phenomenon that is studied by scholars, often under the lens of social psychology theories. Westphal and Milton (2000) argue that diversity tends to undermine cohesion and that social barriers reduce the probability of minority viewpoints influencing group decisions.

This perspective is closely related to tokenism and critical mass theory, often used in the research on board gender diversity. There are claims that the numerical proportion of female directors must be "significant" enough to allow the female "voice" to be heard and truly valued (Low et al., 2015; Reguera-Alvarado et al., 2017). Empirical endorsement of this theoretical framework appears in some papers, where group heterogeneity is found to require a certain critical mass, (the actual size varies from paper to paper) often involving the participation of women, before the benefits of board diversity can be achieved (Torchia et al., 2011; Jaquette, 1997). This perspective suggests a non-linear quadratic relationship, rather than the more traditional and widely studied linear one, which will be studied and discussed later. Minority groups need to attain a specific size in order to realize their positive impact on performance. In line with the above, other scholars, working under the prism of social psychology theory, argue that more diverse boards may be hampered by conflict and divergent opinions prolonging the decision-making process and making it less effective (Campbell and Minguez-Vera, 2008; Carter et al., 2010; Lau and Murnighan, 1998). The potential need to integrate a wider range of ideas and perspectives, along with the aforementioned enhanced creativity, irrevocably, albeit understandably, slows down the decision-making process for a diverse board.

In summary, theorists predict that a diverse board may either improve or degrade performance. That said, the literature seems to lean towards a net positive effect of diversity, thus giving a slight edge to the most dominant theories in the field (agency and resource dependence). Still, while doubt remains, it is mandatory to perform a detailed analysis of the existing empirical evidence. Furthermore, it is crucial to clarify which of the two main theories prevails as the primary pathway for the observed positive effect of diversity.

Very few studies differentiate between types and roles of directors, an approach that can potentially lead to biased and mixed results when analyzing different board configurations. This study distinguishes between insiders and outsiders. Insiders, including executive directors, have direct affiliations with the firm, while outsiders, comprising non-executive and independent directors, maintain affiliations outside the firm.

Executive directors have a broader and closer knowledge of the firm's insights, interests and ways of operating and therefore tend to be more closely involved in the strategic decisions of the firm. Independent directors, on the other hand, are appointed for their particular expertise as advisors, and also for their ability to remain loyal to the firm's owners by having no executive function within it. However, non-executive directors, dubbed "grey directors" in some studies, are often appointed for their ability to remain loyal to shareholders, since they have no financial interest in the firm. In fact, non-executives act largely as representatives of major shareholders, and their primal interest might therefore be to monitor the board. It is these who will provide us with the key to identifying the pathway of the diversity effect on performance.

In short, we theorize that the function of executive directors is of a more strategic nature, since their ties with the firm make them the least suited for a supervisory role. Independent directors have no links with the firm other than sitting on the board and are often appointed for their expertise in a particular field, and thus we hypothesize that they have a dual advisory and supervisory function. Non-executive members of the board often act in the representation of major shareholders and are not involved in day-to-day management; their natural alignment with shareholders' interests, therefore, leads us to propose that their role is primarily supervisory.

Meanwhile, a large information advantage due to their full-time status and insider knowledge can induce managers to use the board to act in their own interests to the detriment of shareholders (Williamson, 1984; Lanis et al., 2020). Managers with this kind of power show a tendency to expropriate shareholders' wealth through non-profit maximizing activities or even to use accounting engineering to inflate their own performance- or stock price-linked remuneration (Fama, 1980; Fama and Jensen, 1983; DeAngelo et al., 1994;

Yermack, 1996; Lanis et al., 2020). On the other hand, "the internal managers of the firm are normally the most important members of the board as they hold valuable information about the firm's activities that aids the board in making good decisions" (Fama, 1980; Fama and Jensen, 1983; Lanis et al., 2020). This explains why executive directors are unlikely to make the best monitors (agency theory) while their access to unique bits of information fits them perfectly for strategic decision-making (resource dependence theory).

Thus, we invoke the resource dependence theory to argue that, in relation to executive directors, diversity operates through their strategic decision-making skills and the contribution of original and new ideas; we draw on agency theory and resource dependence theory to propose that, in relation to independent directors, it operates through their freedom of action; and again on agency theory to contend that, in relation to non-executive or "gray" directors, it operates via their ability to monitor the board and avoid agency problems. Having established this distinction, we are able to explore the pathway by which each diversity parameter affects performance (agency theory, resource dependence theory, or both) depending on the type of director in which it has the most influence.

2.2. Empirical evidence: mixed results to date

Various complete reviews of the extant literature (Aggarwal et al., 2019; Kagzi and Guha, 2018) have found a clear discrepancy in results regarding the effect of board diversity on performance. Some studies, focusing mainly, but not exclusively, on gender diversity (the parameter that attracts by far the greatest academic interest) document a positive effect (Ahmed and Ali, 2017; Ararat et al., 2015; Arun et al., 2015; Birindelli et al., 2024; Campbell and Mínguez-Vera, 2008; Carter et al., 2003; Conyon and He, 2017; Erhardt et al., 2003; Gul et al., 2011; Lai et al., 2017 Wahid, 2018). Others detect a negative effect (Ahern and Dittmar, 2012; Haslam et al., 2010; Talavera et al., 2018) and a few find no significant effect whatever (Carter et al., 2010; Chapple and Humphrey, 2014; Gregory-Smith et al., 2014).

Having outlined the main empirical evidence from aggregate diversity data, we now present the main results for each diversity parameter and the underlying rationale. First, let us note that most studies on this issue not only fail to consider each diversity parameter separately, but they also restrict the focus to gender diversity. This explains why reports supporting individual effects are substantially fewer in number than those supporting gender diversity or aggregate diversity effects.

2.2.1. Gender

Some studies have highlighted gender-related differences in moral and ethical behavior patterns, and in confidence levels (Kray et al., 2014; Levi et al., 2014; Kagzi, 2018). At the same time, a female presence is thought to promote a firm's reputation, corporate social responsibility perception, and CSR ratings (Bear et al., 2010). Furthermore, female decision-making appears to be more closely aligned with shareholder interests and women also appear more willing to invest in innovation (Lakhal et al., 2024; Levi et al., 2014; Zona et al., 2013). Although gender is, so far, the most commonly researched diversity parameter and despite its attracting so much moral and legal attention (most countries are legislating towards gender-balanced boards), the question of its impact on performance (in other words, the possibility of a business case) remains far from clear. Some studies find a positive effect (Ahmadi et al., 2018; Alzayed et al., 2024; Bart and McQueen, 2013; Birindelli et al., 2024; Campbell and Minguez-Vera, 2008; Darko et al., 2016; Green and Homroy, 2018; Lakhal et al., 2024; Saeed et al., 2024; Terjesen et al., 2015; Vieira, 2018); while others find it to be negative (Ahern and Dittmar, 2012; Adams and Ferreira, 2009); Bennouri et al. (2018) and Chapple and Humphrey (2014) find no significant relationship. Drawing on the tokenism theory, Owen and Temesvary (2018) point out that a certain threshold (critical mass in the words of other authors) must be reached before the beneficial effects of gender diversity are felt. This would suggest a nonlinear U-shaped relationship, which most authors capture by modeling diversity as a quadratic variable. Other authors point out that the gender effect is contingent on governance quality (Adams and Ferreira, 2009). Overall, the evidence suggests either a positive or a non-significant impact (Ben-Amar et al., 2013).

2.2.2. Age

Age diversity is commonly viewed in the literature as a double-edged sword, since age is ultimately a proxy of two attributes, namely experience and risk aversion (Johnson et al., 2013; Miller, 1991; Kagzi, 2018), with younger board members being less risk averse and more willing to initiate strategic changes and older ones contributing a greater wealth of experience. Kim and Lim (2010), Siciliano (1996), Mahadeo et al. (2012) and Fernández-Temprano and Tejerina-Gaite (2020) found a positive link between age diversity and performance, implying that it would provide the firm with an adequate balance between experience on the one hand and risk-taking and strategic change on the other. Hafsi and Turgut (2013), meanwhile, found a link between age diversity and lower performance levels; Jhunjhunwala and Mishra (2012) and Bonn et al. (2004) found no significant correlation.

2.2.3. Tenure

A better level of communication is possible with a board made up of long-tenured members who have developed a shared language, which facilitates and speeds up their work (Kagzi and Guha, 2018). According to Bell et al., (2011), a deeper understanding of the firm's corporate and organizational culture, internal insights, and resources will ensure performance capacity; while (Finkelstein and Hambrick, 1997) argued that a board environment with a mix of tenure lengths is more conducive to socialization and the forging of relationships that benefit board members. Extreme lengths of tenure, whether long or short, appear to be associated with more effective monitoring. Brief tenures mean continuous rotation and more frequent incorporation of new views and attitudes towards management (Ahmadi et al., 2018). At the same time, however, long tenure should provide a better understanding of ongoing management team practices that could enhance monitoring capacity (Ben-Amar et al., 2013).

However, longer tenure may be linked to greater risk aversion and adherence to the status quo (Bantel and Jackson, 1989; Michel

and Hambrick, 1992; Kagzi, 2018), which would reduce willingness for strategic change and thus hamper performance. In this line, Musteen et al. (2006) and Golden and Zajac (2001) report an association between longer tenure and reactions characterized by aversion to change, intransigent beliefs, and inflexible mental schemes in the face of key decisions, which potentially hampers creative thinking and the emergence of innovative ideas. That being said, it can be argued that diversity can accommodate both long and short tenure. Following this line of thought, Knight et al. (1999) reports a positive relationship between tenure diversity and strategic consensus, whereas Fernández-Temprano and Tejerina-Gaite (2020) found no significant relationship between tenure and accounting or market-based performance for Spanish firms.

2.2.4. Education

Education, measured in terms of attainment or area of specialty, could shape the kind of ideas that might be aired at meetings, relationships among board members, and, consequently, the development of creative ideas. Thus, a greater diversity of professional specialties and attainment levels could promote innovative and creative thinking. On the other hand, it could be speculated that a poor balance of educational attainment levels or specialism areas could result in ideas being dismissed or underestimated. It could also be hypothesized that a variety of professional specialties would work better in industries where there is potential for interdisciplinary collaboration or business diversification. Amid a very meager research panorama on this aspect of diversity, our review turned up works such as Mahadeo et al. (2012) which reports a negative influence; and Murray (1989), Kim and Lim (2010) and Gray and Nowland (2017) which find it to be positive. Another study, by Adams et al. (2018), which reports a negative impact, distinguishes itself by measuring educational diversity as heterogeneity in directors' skill sets. Alzayed et al. (2024) found that diversity in financial education boards is associated with greater risk.

2.2.5. Nationality

In line with the resource dependence theory, some studies report a positive effect on firm internationalization, expertise in foreign markets and widening of the network of international contacts. On the other hand, a high degree of cultural diversity could lead to problems of communication and integration, or trigger conflicts affecting the speed and accuracy of the board's decisions. Empirically, Oxelheim and Randøy (2003); Choi et al. (2007) and Delis et al. (2017) found a positive effect of nationality diversity on performance, whereas Guest (2019) and Carter et al. (2010) found no evidence whatsoever of this or the opposite effect.

2.3. Ambiguity in results

In view of the ambiguity in reported findings, it is crucial to investigate possible explanations for the discrepancies, the first of which has to do with the way diversity is measured. In a significant number of studies, it is measured as either a proportion or a percentage of a specific attribute, such as gender(Aggarwal et al., 2019). The Blau index (Blau, 1977) and the coefficient of variation are the preferred alternatives and will be used in this study. To continue on the subject of measurement, some studies use a global diversity index in which all variables have the same weight (Ararat et al., 2015), and others focus solely on gender diversity while disregarding other demographic parameters (Aggarwal et al., 2019). Performance measurement issues could also play a role, since results could differ when using market-based as opposed to accounting-based variables (Haslam et al., 2010).

Other possible sources of ambiguity are the sample selection and data treatment options: most studies use cross-sectional data (Heyden et al., 2015), making endogeneity and reverse causality problems more difficult to deal with than when using panel data (Adams et al., 2010).

As found in the meta-analysis conducted by Post and Byron (2015), ambiguity in results may also derive from contextual factors relating to a specific country, industry, or institutional legal system (Terjesen et al., 2015), or to the time period covered by the sample. The predominant use of single-country data is a further possible explanation for differences in results between studies. Carter et al. (2010) hypothesizes that, in certain countries or cultural settings, some diversity parameters prevail over others, thus reflecting different societal configurations. Studies such as (Kagzi and Guha, 2018) or (Bezemer et al., 2022) therefore emphasize the importance of cross-country analysis aimed at providing more reliable guidelines for practitioners and enabling more informed extrapolation to specific countries.

Digging deeper into this argument, different studies use different moderator variables and some use none. The variables proposed to mediate the diversity-performance relationship include CSR ratings and reputation (Adams, 2015; Bear et al., 2010; Miller, 2009); ownership configurations and CEO or board ownership (Aggarwal et al., 2019; Ben-Amar et al., 2013; Kim and Kim, 2015); innovation intensity (Kim and Kim, 2015; Miller and del Carmen Triana, 2009; Nawaz Khan et al., 2019) and board monitoring activity (Adams and Ferreira, 2007). In a similar vein, and in relation to the previous argument, countries with high ownership concentration, high industrial innovation levels, or a range of attitudes and public opinion with respect to diversity (reputation as a mediator) are likely to yield different results. Likewise, we believe that a broad sample encompassing different countries, board configurations, and industries would address this issue and mitigate bias in results.

The discussed ambiguity also suggests a possible non-linear relationship, meaning that diversity could be positive or negative depending on the diversity level attained. The shape of the relationship between board diversity and performance varies from one study to another. Most works analyze a linear relationship, while others find the effect to be nonlinear and inverted U- shaped (Adams and Ferreira, 2009; Ararat et al., 2015; Kim and Kim, 2015). This has led to the claim that negative effects are less likely to be observed at lower levels of diversity, while positive effects may dilute with higher levels.

To protect our results from bias and compensate for potential sources of ambiguity, our paper makes several amendments to the research design. Ours is a multi-country study based on a wide sample of data from nine major European countries; it covers multiple

industries and legal environments and uses a generous time frame (2007–2018) including a period of financial crisis. It also uses panel data methodology, and the most appropriate diversity measures (Blau indices and coefficients of variation). Furthermore, this study checks for non-linear relationships, using both accounting and market proxies for performance. Finally, data disaggregation by director type enables us to identify the theoretical pathway through which board diversity exerts its influence on the firm.

2.4. Hypotheses

Executive directors have a strategic function, non-executive directors have a monitoring role and independent directors perform both monitoring and advisory tasks. Based on this, we propose that the outcomes of diversity parameters will differ according to director type.

Additionally, the role distribution per director type suggests the hypothesis that, if the diversity parameter is significant only in the case of executives, the main channel for the diversity effect is through better strategic decision-making, as argued by the resource dependence theory. If significance is found only in the case of non-executives, it is through better monitoring, as per the agency theory. If significance is found only for independent directors, it is both through better advisory support and the ability to form relationships with key external agents, as claimed by the resource dependence theory, as well as through more effective monitoring of management, as per the agency theory. Hence, if found to be significant in both independent and non-executives, the main pathway for the effect of diversity would be through monitoring (agency theory), and, if found significant in executives and independents, the main pathway would be through better strategic decision-making (resource dependence theory).

With respect to gender diversity, any increase might lead to a wider range of perspectives and insights and enhance board supervisory capacity (Adams et al., 2009; De Masi et al., 2020; Rahman and Zahid, 2021). However, a certain gender diversity threshold may be required to produce a significant effect. For that reason, a quadratic effect is expected (Owen and Temesvary, 2018; Ben-Amar et al., 2013; Farag and Mallin, 2017; De Masi et al., 2020). Until the minority group attains the minimum threshold required for their views to be heard, the effects of limited cohesion and communication barriers (social and psychology theories) prevail, thus hindering performance. Once the required threshold is reached, the positive effect of diversity outweighs its negative effect and the relationship between diversity and performance becomes U-shaped.

This effect, as derived from tokenism and critical mass theories, albeit less explored in relation to attributes other than gender, can easily be extrapolated to any other diversity parameter, and thus will be used henceforth in Hypotheses 2a, 3a and 4a. Since diversity is expected to have a positive impact, a quadratic effect is also likely.

At the same time, the most compelling evidence points to a relationship between performance and board gender diversity mediated by better monitoring capabilities (Adams et al., 2009; De Masi et al., 2020; Rahman and Zahid, 2021).

Non-executive directors are more closely aligned with supervising board functions due to their primary role representing major shareholders. As independents serve both advisory and monitoring roles, according to literature and empirical results, we will posit that independents are more valuable here for their monitoring role, which we identify as the main pathway conducive to value for gender diversity. They provide impartial judgment and oversight, free from conflicts of interest that may arise from involvement in day-to-day operations or any affiliation with the company or its management (Adams et al., 2010). For those reasons, a positive U-shaped effect is expected for those director types.

The prime focus of executive directors is on operational management and execution and strategic decision-making, which makes them the least suited to acting as overseers. Research has shown that they tend to use their insider knowledge to act in their own interests to the detriment of shareholders (Williamson, 1984; Lanis et al., 2020). Based on this and given that it is the supervisory role of board members that is highlighted by the literature as a channel of mediation, we propose that gender diversity among executive directors will have less impact on firm performance than that which exists among non-executive directors, whose role tends more towards governance and oversight. Therefore, a non-significant effect is expected for gender diversity among executives.

Hypothesis 1a. : *Gender diversity among independent and non-executive directors has a U-shaped effect on firm performance.*

Hypothesis 1b. : *Gender diversity among executive directors has a non-significant effect on firm performance.*

Regarding the second diversity parameter studied here, research suggests that age diversity promotes a balance between seasoned expertise and fresh perspectives, thereby enhancing decision-making and strategic agility (Johnson et al., 2013; Miller, 1991). However, as in the previous case, there may be a U-shaped effect, in line with the critical mass and tokenism theories (Ben-Amar et al., 2013; Farag and Mallin, 2017; De Masi et al., 2020). According to the literature, unlike other diversity in attributes such as gender, diversity of age does not necessarily enhance a board's oversight capabilities, since diverse age groups may not inherently possess better monitoring skills.

Executives play a more pivotal role in setting strategic direction, rather than in governance oversight. By the reasoning applied for gender diversity, since independents serve both advisory and monitoring roles, and given that the literature highlights strategic decision-making as the most likely pathway for the benefits of age diversity, we posit that independents add more value to the firm through their role as strategic decision-makers. Therefore, we expect a shaped U effect for age diversity among executive and independent directors.

This positive effect may be less pronounced when the age diversity is among non-executive directors, who are better suited for governance oversight. Therefore, a non-significant effect is expected in relation to this type of directors.

Hypothesis 2a. : *Age diversity among executive and independent directors has a U-shaped effect on firm performance.*

Hypothesis 2b. : *Age diversity among non-executives has a non-significant effect on firm performance.*

With respect to tenure diversity, both longer and shorter tenures are viewed by the literature as a means toward better monitoring. Brief tenures imply continuous rotation and the frequent introduction of new views and attitudes to management (Ahmadi et al., 2018), while long ones are expected to provide a deeper understanding of ongoing management team practices that might enhance monitoring capacity (Ben-Amar et al., 2013). Therefore, board tenure diversity may promote a more dynamic monitoring environment by combining a broad spectrum of perspectives and experiences.

Empirical evidence suggests that tenure diversity may enhance the supervisory role of the board by introducing diverse viewpoints and enhancing monitoring capabilities (Ahmadi et al., 2018; Ben-Amar et al., 2013). A study by Li and Wahid (2018) empirically found an enhancement in board oversight capabilities, measured as CEO turnover sensitivity, but failed to find any significant improvement in financial performance. This suggests that, while tenure diversity may contribute to increased vigilance and accountability in monitoring executive behavior, its direct impact on financial outcomes remains uncertain.

The literature is less optimistic with respect to the strategic role, however. Longer board tenure has been linked to greater risk aversion and resistance to change (Bantel and Jackson, 1989; Golden and Zajac, 2001; Michel and Hambrick, 1992; Musteen et al., 2006) that could potentially hamper the board's strategic management role. This resistance to change can stifle innovation and inhibit the exploration of new strategic opportunities.

Diversity of tenure may also exacerbate communication challenges within the boardroom. Board members with varying lengths of tenure may struggle to establish cohesive communication channels, potentially impair decision-making, and hinder strategic alignment through poor communication, limited knowledge sharing, and a lack of cohesion. Heterogeneity in director characteristics could also lead to the formation of subgroups (based on nationality, political inclinations, or attitudes toward life), ultimately degrading performance and undermining group cohesion. Our judgment is that this can be avoided in firms where there is a more homogeneous board comprising longer-tenured directors, in the belief that the need to work together for longer periods of time encourages board members to overcome any initial differences.

Considering the nuanced impact of tenure diversity on board dynamics, divergent effects on firm performance are also anticipated based on director type. Tenure diversity among non-executive directors, the best suited for oversight roles, may prove beneficial by enhancing board supervisory quality. However, among executives, whose prime role is strategic management, tenure diversity may have negative consequences due to the associated risk aversion and communication challenges. Meanwhile, independent directors serve both roles, and given literature's repeated emphasis on their positive influence on board monitoring quality, we hypothesize that it is through this that they play a more value-added role. Hence:

Hypothesis 3a. : *Tenure diversity among non-executive and independent directors has a U-shaped effect on firm performance.*

Hypothesis 3b. : *Tenure diversity among executives has a negative effect on firm performance.*

With respect to diversity of education, as a source of creative thinking and original ideas, we also postulate that, when present among executive and independent directors, its effect on firm performance is non-linear. At the same time, since it in no way enhances the board's monitoring capacity, we postulate a non-significant effect in relation to non-executive directors. Our hypothesis, therefore, is that the significance of the diversity effect derives from breadth of education (that is, diversity of discipline) while we expect depth of education (that is, level of educational attainment) to remain non-significant. The rationale for this is that most of the research has found the effect of breadth of education to be positive (Kim and Lim, 2010; Gray and Nowland, 2017) whereas very few studies report any significance of depth of education. Likewise, we find this coherent with the theory presented, since original ideas and creative thinking can flourish more easily if board members come from different fields of learning, whereas heterogeneity in educational attainment would not necessarily enhance either creative thinking or multi-faceted problem-solving.

Hypothesis 4a. : *Diversity in the breadth of education among executive and independent directors has a U-shaped effect on firm performance.*

Hypothesis 4b. : *Diversity in the breadth of education among non-executive directors has a non-significant effect on firm performance.*

Hypothesis 4c. : *Diversity in the depth of education among directors of any type has a non-significant effect on firm performance.*

With respect to diversity of nationality, as outlined in the literature on the topic, the potential effect depends greatly on country-specific factors. For instance, ethnic diversity would have a greater and more noticeable effect in the US, which is clearly ethnically diverse, than in many European countries. It could also be argued that the unique psychological traits of different nationalities become diluted in a multi-country European context. While most of the literature on the subject relies on panel data for US firms, there is a lack of evidence based on European firm-level data. Thus, we are unable to extrapolate predictions from previous studies.

However, if there is a single attribute that generates a difference in culture and attitude, potentially leading to conflict and poor communication, it is nationality. Thus, based on social psychology theories, we hypothesize a negative effect of nationality diversity on firm performance through its impact on group cohesion and quality of communication.

Hypothesis 5. *Nationality diversity has a negative impact on firm performance regardless of director type.*

3. Empirical model

3.1. Data

The data used in this study were drawn from the NGR Metrics and Refinitiv Eikon databases. The data-building process posed several challenges: the data describing board diversity were drawn primarily from individual director statements and used to construct a firm-year data panel.

The data set consists of a large number of firms from different countries, including some, such as Finland, Germany and Netherlands, which differ from the rest by having firms with dual-structure boards. This meant that the size and independence variables required adjustment to enable comparison and to avoid bias in the results. Thus, we propose two alternative measures for the size and independence of dual boards and standard measures from the literature for unitary boards. Likewise, the variable for the number of meetings, considered useful a priori, had to be dropped from the general regression owing to a lack of information for dual boards.

Due to their capital structure and regulatory issues, financial firms were excluded from the sample. The removal of these firms and those with insufficient data for the study period left a sample with 15.471 observations. Table 1 shows the distribution of observations by sector, and Table 2 specifies the distribution by country.

3.2. Variable definition

In the subsequent sections, we will delineate the variables utilized in this study, categorizing them as dependent, independent, and control variables.

Dependent variables

Drawing on previous literature, we use both a financial measure and an accounting-based measure of performance. Previous studies have observed a positive influence on performance when using an accounting-based proxy, and a negative effect when using one based on market data (Haslam et al., 2010). The generalizability of this is uncertain, since it could be due to context-specific factors, but it is worth noting and checking. We address this concern by using both an accounting and a market-based performance proxy to avoid variable selection bias.

As a market-based performance measure, we resort to Tobin's Q (Total Market value/Total assets value), which has a high value when the firm has valuable intangible assets, investment opportunities, or signed patents. This constitutes the main dependent variable, but, for the sake of robustness, we also use an accounting-based performance measure, which serves a dual purpose, both as a robustness check and as a test for the hypothesis of Haslam et al. (2010) in the context of a multi-country sample. Our accounting-based performance measure is the return on assets (ROA), which is the coefficient between earnings before interest and taxes and net assets (see Table 3).

Independent variables

To assess the influence of board diversity, we use measures of dispersion in the different attributes used to describe the directors. The choice of measure depends on the type of attribute. For gender and financial expertise, we use the Blau index[1] (Blau, 1977), as prescribed for discrete attributes; and the coefficient of variation[2] for the continuous variables, such as age or tenure, for which the Blau index is not suited (Tsui et al., 1995). The normalized Blau index, which captures within-group heterogeneity, with values ranging from zero to one, takes its maximum value of 1 if all members are identified as belonging to the same attribute category.

As in most related studies, we consider diversity in demographic attributes such as gender, age, nationality, tenure, and education (see Table 3).

For notation, we use letter and number prefixes (letters for the director types and the numbers 1–6 for the attributes). Thus, the prefix E denotes executive directors (ED1, ED2, ED3, ED4, ED5 and ED6); NE, non-executive directors (NED1, NED2, NED3, NED4, NED5 and NED6) and I, independent directors (ID1, ID2, ID3, ID4, ID5 and ID6). Finally, the suffix QR is added for squared measures of the diversity parameters. Thus, NED1 denotes the Blau index of gender diversity for non-executive directors and NED2QR denotes the squared coefficient of the variation in age.

It is important to notice that, while most of the diversity parameters are captured by a single diversity variable (D1, D2, D3 and D6), education diversity is captured in our model through two variables (D4 and D5). This is to differentiate between breadth of education (diversity in board members' fields of study) and depth of education (diversity in their levels of qualification, Bachelor's, Master's or PhD). The variables for diversity in fields of education could be improved by, for example, defining a variable for heterogeneity in board expertise (legal, academic, or accounting and financial). However, data availability issues prevented us from taking this course, since the database included only financial expertise.

Control variables

Ten control variables are taken from corporate governance studies in this specific field (see Table 3). SIZE controls for firm size calculated as the natural logarithm of total firm assets in order to avoid potential heteroskedasticity issues in the regression results.

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[1] Standardized Blau-Index $= \left(1 - \sum_{i=1}^{p} x_i^2\right) * \frac{p}{p-1}$ where x_i is the frequency of each category of the chosen attribute variable, and p the number of possible categories for the attribute.

[2] Coefficient of variation $= sd_i / \overline{x_i}$ where sd_i is the standard deviation of the variable, and x_i its average.

Table 1
Distribution of the sample by sector.

Observations	Percentage	Sector
510	3.30 %	Energy
1,174	7.59 %	Materials
3,761	24.31 %	Industry
2,288	14.79 %	Consumer goods
891	5.76 %	Staple consumer goods
1,254	8.11 %	Health
1,744	11.27 %	Technology and information
1,142	7.38 %	Communication services
517	3.34 %	Public utility services
35	0.23 %	Real Estate

Table 2
Distribution of the sample by countries.

Observations	Percentage	Country
689	4.45 %	Belgium
837	5.41 %	Finland
2,460	15.90 %	France
2,730	17.65 %	Germany
1,563	10.10 %	Italy
639	4.13 %	Netherlands
967	6.25 %	Spain
1,652	10.68 %	Sweden
3,934	25.43 %	United Kingdom

Table 3
Variables description.

DEPENDENT VARIABLES	
ROA	Net income/Total assets
TOBIN	Total Market value/Total assets value

INDEPENDENT VARIABLES	
d1	Diversity of gender. Blau index.
d2	Diversity of age. Coefficient of variation.
d3	Diversity of tenure. Coefficient of variation.
d4	Diversity of financial expertise. Blau index.
d5	Diversity of education. Three identified levels of educational attainment, Bachelor, Master and PhD. Coefficient of variation.
d6	Diversity of nationality. Coefficient of variation.

CONTROL VARIABLES	
SIZE	Natural logarithm of total assets
BSIZE	Total number of directors for unitary boards; number of supervisory board members otherwise.
BIND	Independent directors/(Independents+Non-Executives) for unitary boards and Independent directors/Supervisory board Size if board is dual
NCOMM	Number of committees, from 0 to 4.
INTAN	Intangible Assets/Total Assets.
DEBT	Total Debt/Total Assets.
lAGE	Natural logarithm of firm age in years.
CEOOWN	Percentage of ownership held by the CEO.
BOWN	Percentage of ownership held by the board.
T5SHARE	Percentage of ownership held by top 5 shareholders (a measure of ownership concentration).

BSIZE controls for board size and BIND for board independence; while NCOMM controls for the number of committees. Board independence and the number of committees influence board agency relationships; therefore, assuming that diversity improves monitoring capacity, firm performance could become more vulnerable in the presence of fewer committees and less independence and thus require closer monitoring. We also control for intangible assets, denoted by INTAN, for leverage with DEBT, and for firm age with lAGE. Finally, we control for ownership structure with BOWN, CEOOWN and T5SHARE denoting the percentage of ownership held, respectively, by the board, CEO and five major shareholders.

Note that board independence and board size are defined differently for dual than for unitary board structures. This enables us to maintain homogeneity within our multi-country sample with two board types. Thus, we use a non-conventional definition of BIND for unitary boards; Independent directors/ (Independents+Non-Executives) rather than a more traditional definition; Independent directors/(Total Board), and Independent directors/Supervisory board Size for dual boards. This makes the BIND variable comparable for both board types.

3.3. Model and methodology

As just outlined, Tobin's Q is our main performance variable, but ROA is also employed as a robustness check and as a way to determine whether the inclusion of an accounting proxy alters the results. Our model thus takes the following form:

$$Performance_{jt} = \beta_0 + \gamma_i d_{ijt} + \sum_{n=1}^{10} Control_{njt} + \eta_j + \varepsilon_{jt}$$

Note that this model is repeated for each director type, using Tobin's Q as the performance proxy prefixed according to director type.

We use a panel data set where the sub-index j denotes the firms and the sub-index t represents time. This model is replicated in a simpler form using an accounting performance variable (ROA) to replace Tobin's Q. To avoid overextending the paper, this simplified model makes no distinction between director types; the six possible diversity parameters are denoted by i; n denotes the aforementioned control variables where $n = 1$–10.

The random disturbance term has two components: ε_{jt} denotes factors affecting entrepreneurial performance, which varies between individuals and time periods under the assumptions of the classical linear regression model and η_j denotes firm fixed effects, which may be correlated with the explanatory variables and could significantly bias the estimates. It is possible not only to detect but to effectively eliminate this "constant unobservable heterogeneity" by running the model with a within-firm fixed-effects estimator.

A Hausman test (Hausman, 1978) is conducted on each model to enable the choice between random effect and fixed effect estimation. In every case, fixed effect estimation was the preferred option, as the obtained p-value was below 0.05. As a result, neither country nor industry dummies were required as, being constant for each firm, they are superfluous to a fixed effect model.

4. Results

4.1. Descriptive analysis

Table 4 shows a descriptive analysis of all the control variables after reducing the effects of potential spurious outliers by winsorizing the variables at two percent. Table 5 describes the correlation among the diversity variables and between these and the control variables. No correlation problems were found, and, once winsorized, all the control variables fell within the expected intervals. At the same time, diversity variables are added to the model one by one in most of the presented tables to avoid further problems and biased results.

4.2. Explanatory analysis

Given the large number of variables and possible interactions, the results are presented with the diversity variables added one by

Table 4
Descriptive analysis.

Variable	Obs	Mean	Std. Dev.	Min	Max
TOBIN	14,407	1.544	1.187	.098	6.677
ROA	13,941	.037	.076	−.248	.214
INTAN	14,645	.123	.151	.000	.939
SIZE	15,058	7.128	1.980	3.113	11.425
BSIZE	14,980	2.083	.429	.000	3.219
BIND	15,058	.590	.257	.000	1.000
BOWN	15,058	.070	.157	.000	.683
CEOOWN	15,058	2.257	7.725	.000	41.500
NCOMM	15,058	1.528	1.350	.000	4.000
T5SHARE	15,058	.487	.240	.036	1.000
DEBT	15,058	.216	.169	.000	.985
lAGE	14,135	2.601	.886	.000	4.111
d1	15,058	.516	.338	.000	1.000
d2	14,061	.185	.160	.031	1.619
d3	14,791	.652	.304	.000	2.357
d4	15,058	.805	.222	.000	1.000
d5	10,131	.327	.189	.000	.693
d6	15,058	.357	.369	.000	1.000

Table 5

Variables correlation.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) INTANGIBLE	1.000															
(2) SIZE	−.047	1.000														
(3) BOARDSIZE	−.060	.668	1.000													
(4) BIND	.072	−.168	−.426	1.000												
(5) BOWN	.021	−.228	−.183	.012	1.000											
(6) CEOOWNERSHIP	−.017	−.177	−.214	.011	.549	1.000										
(7) NCOMM	−.078	.052	.082	−.066	.017	.011	1.000									
(8) T5SHARE	.015	−.190	−.048	−.174	.309	.121	.092	1.000								
(9) DEBT	.085	.243	.131	−.052	−.065	−.030	.023	−.023	1.000							
(10) lAGE	−.100	.257	.206	−.025	−.027	−.078	.024	−.067	−.040	1.000						
(11) d1	.049	.034	.084	.065	−.026	−.042	.051	.002	.004	.130	1.000					
(12) d2	−.081	−.151	−.184	.255	.047	−.014	.035	.015	.021	.032	.037	1.000				
(13) d3	.011	.088	.168	−.153	.035	.014	−.026	.045	−.033	.124	.073	−.433	1.000			
(14) d4	−.019	.009	.045	.018	.059	.029	.066	.060	.041	−.012	−.016	.078	−.018	1.000		
(15) d5	−.074	.174	.159	−.037	−.096	−.097	.019	−.060	.044	.024	.051	−.039	.003	.001	1.000	
(16) d6	.013	.306	.150	.071	−.134	−.073	−.018	−.201	.073	−.005	−.007	−.040	.016	.016	.132	1.000

one to enable individual hypothesis testing. This yields richer information than a single regression with all the diversity and moderator variables thrown in, and thus also avoids potential multicollinearity errors.

For proper interpretation of the following results, each table includes a single diversity parameter (numbered from one to six), and reports on two models; one with all the control variables and one of the six diversity variables; and another with both the quadratic and linear measures of the diversity parameter. Both models are repeated using a different director type and diversity parameter for each estimation.

Notably, the very low p-values of the Hausman test are the reason for the decision to use fixed rather than random effects models in every regression henceforth.

4.2.1. Gender diversity (d1)

As can be seen in Table 6, gender diversity has a linearly positive and significant effect, but, when the data are broken down by director type, its relationship with non-executive directors is linearly negative and quadratically positive, thereby confirming the predicted U-shape. This can be seen in Fig. 1, where we plot this U-shaped relationship graphically using the significant coefficient given by the panel-data fixed-effects regression.

Meanwhile, the relationship for independent directors is linearly positive and much stronger than for non-executives, while being non-significant in relation to executive directors.

Thus, one of the two hypotheses proposed for gender diversity, hypothesis H1a, is partially confirmed (see Fig. 1). Gender diversity exhibits a U-shaped effect in relation to non-executives and a linear effect in relation to independents. Meanwhile, H1b is fully confirmed since the effect shown in the regression is non-significant.

Table 6
Panel regression fixed effects for gender diversity and market performance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	d1	d1QR	ed1	ed1QR	ned1	ned1QR	id1	id1QR
INTANGIBLE	.081	.080	.092	.095	.332**	.327**	.088	.089
	(.452)	(.452)	(.434)	(.420)	(.011)	(.012)	(.416)	(.411)
SIZE	.384***	.384***	.396***	.396***	.340***	.340***	.375***	.375***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
BSIZE	.021	.021	.017	.011	−.020	−.009	−.010	−.014
	(.647)	(.646)	(.73)	(.82)	(.727)	(.877)	(.838)	(.771)
BIND	−.079	−.079	−.057	−.048	.199***	.178**	−.136**	−.144**
	(.148)	(.148)	(.339)	(.419)	(.006)	(.014)	(.038)	(.030)
BOWN	−.108	−.108	−.097	−.098	−.036	−.037	−.096	−.096
	(.279)	(.279)	(.362)	(.360)	(.754)	(.749)	(.342)	(.339)
CEOOWN	.001	.001	.002	.002	.000	.000	.001	.001
	(.505)	(.504)	(.350)	(.362)	(.963)	(.986)	(.537)	(.535)
NCOMM	−.009	−.009	−.009	−.010	.001	.002	−.0100	−.0100
	(.364)	(.364)	(.406)	(.377)	(.927)	(.898)	(.348)	(.355)
T5SHARE	−.100	−.100	−.113	−.111	−.054	−.054	−.102	−.101
	(.123)	(.123)	(.109)	(.113)	(.483)	(.482)	(.126)	(.130)
DEBT	−1.199***	−1.199***	−1.233***	−1.233***	−1.162***	−1.162***	−1.176***	−1.176***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
lAGE	.076***	.076	.101***	.102***	.060***	.061***	.072***	.073***
	(.000)	(.000)	(.000)	(.000)	(.010)	(.009)	(.000)	(.000)
d1	.07**	.066						
	(.010)	(.419)						
d1QR		.004						
		(.963)						
ed1			−.030	.193				
			(.246)	(.187)				
ed1QR				−.245				
				(.121)				
ned1					−.021	−.302**		
					(.455)	(.018)		
ned1QR						.304**		
						(.024)		
id1							.085***	.160***
							(.000)	(.060)
id1QR								−.079
								(.361)
_cons	−1.208***	−1.208***	−1.302***	−1.297***	−1.013***	−1.019***	−1.052***	−1.05***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Observations	12,462	12,462	11,388	11,388	8,838	8,838	12,162	12,162
R^2	.088	.088	.088	.088	.096	.097	.085	.086

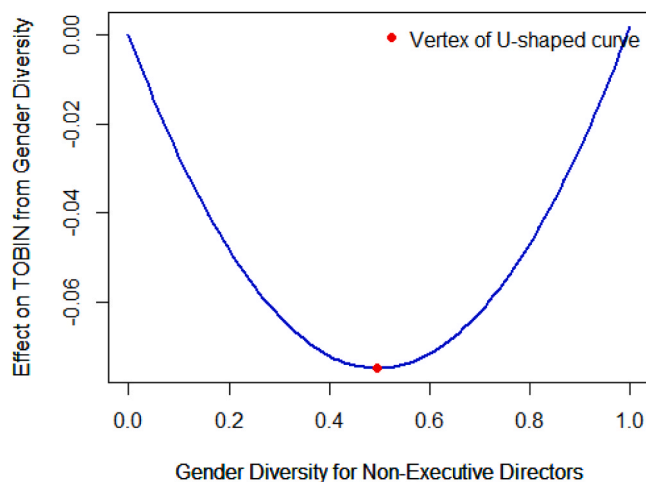p-values are in parentheses
*** p<.01, ** p<.05, * p<.1

Fig. 1. Graph of the relationship between performance and gender diversity for non-Executive Directors.

Table 7
Panel regression fixed effects for diversity of age on market performance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	d2	d2QR	ed2	ed2QR	ned2	ned2QR	id2	id2QR
INTANGIBLE	.101	.096	.090	.082	−.115	−.115	.121	.124
	(.349)	(.372)	(.554)	(.591)	(.448)	(.449)	(.266)	(.253)
SIZE	.419***	.417***	.507***	.509***	.402***	.402***	.408***	.408***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
BSIZE	.100**	.113**	.124**	.128**	.081	.080	.084	.078
	(.03)	(.015)	(.048)	(.04)	(.226)	(.233)	(.105)	(.133)
BIND	−.032	−.034	−.009	−.017	.27***	.273***	−.062	−.071
	(.558)	(.533)	(.897)	(.811)	(.001)	(.001)	(.368)	(.306)
BOWN	−.125	−.106	−.092	−.075	.062	.063	−.015	−.011
	(.223)	(.301)	(.482)	(.566)	(.633)	(.627)	(.891)	(.916)
CEOOWN	.001	.001	.002	.002	−.004	−.004	−.001	−.002
	(.508)	(.584)	(.451)	(.432)	(.171)	(.171)	(.489)	(.468)
NCOMM	−.008	−.009	−.020	−.023*	.005	.006	−.007	−.007
	(.44)	(.397)	(.116)	(.082)	(.655)	(.641)	(.524)	(.532)
T5SHARE	−.135**	−.138**	−.120	−.121	−.031	−.033	−.154**	−.152**
	(.044)	(.038)	(.177)	(.170)	(.711)	(.696)	(.028)	(.03)
DEBT	−1.144***	−1.145***	−1.431***	−1.425***	−.956***	−.955***	−1.258***	−1.258***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
lAGE	.074***	.069***	.097***	.094***	.024	.023	.089***	.089***
	(.000)	(.000)	(.000)	(.000)	(.371)	(.385)	(.000)	(.000)
d2	.118	−.641**						
	(.312)	(.011)						
d2QR		.598***						
		(.001)						
ed2			.162	−.510**				
			(.263)	(.026)				
ed2QR				.891***				
				(.000)				
ned2					−.272**	−.165		
					(.036)	(.491)		
ned2QR						−.237		
						(.598)		
id2							−.207**	.029
							(.039)	(.876)
id2QR								−.229
								(.123)
_cons	−1.705***	−1.601***	−2.486***	−2.437***	−1.879***	−1.884***	−1.599***	−1.604***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Observations	11,587	11,587	7,013	7,013	4,880	4,880	10,296	10,296
R^2	.076	.077	.079	.081	.093	.093	.078	.078

p-values are in parentheses
*** p<.01, ** p<.05, * p<.1

Thus, the net effect of a board with maximum gender diversity generally translates into improved market performance. When it comes to gender diversity among non-executive directors, however, a critical mass threshold must be attained before the positive effects begin to outweigh the potential negative effects, since gender diversity needs to reach a certain level before its impact is felt by the group (U-shaped relationship).

Given that diversity is measured using a standardized Blau index, whose values are confined between 0 and 1, it is crucial to note the value on the X-axis corresponding to the vertex of the U-shaped curve. This value signifies the minimum level of diversity necessary to observe positive outcomes. Were the vertex to exceed one, we could deduce that diversity consistently hampers market performance. Conversely, if the vertex were below 1, positive outcomes would invariably ensue. In this instance, the vertex lies at a normalized Blau index value of 0.497. In this instance, the vertex lies at a normalized Blau index value of 0.497. Bearing in mind that the normalized Blau index ranges between 0 (for the lowest level of board diversity) and 1 (for the highest), the value 0.497 indicates a medium level of diversity.

Since the average gender diversity among non-executive directors is 0.256, its overall impact on market performance is negative, and companies would gain more by increasing gender diversity among non-executive and independent directors.

It is important to note in Fig. 1, however, that the impact of diversity among non-executive directors is very slightly positive, and only becomes apparent at very high levels of board diversity, where the normalized Blau index is close to one. Initially, gender diversity among non-executives could even impair performance, but its effect turns positive towards the upper end of the diversity spectrum. In contrast, regarding independent directors a very positive effect is found.

Moreover, the lack of significance of gender diversity among executive directors, taken together with its positive impact when present among non-executives, reinforces the notion that the incorporation of female board members is beneficial for monitoring performance. While we cannot precisely delineate between the monitoring role and the advisory role as pathways for the positive effect of gender diversity among independent directors, the minimal effect observed in relation to non-executives suggests that the presence of gender-diverse independent directors increases the effectiveness of both monitoring and strategic decision-making.

4.2.2. Age diversity (d2)

Age diversity is positive for the squared performance measure and negative for the linear performance measure, without disaggregation by director type (Table 7). Once decomposed by director type, the effect appears to be associated mainly with executive directors (the same difference emerges between the linear and quadratic value) while it is in all cases negative for both non-executive and independent directors. This implies that, although diversity exerts a positive influence, the sign can vary across different board roles and different threshold levels. Specifically, diversity of age is positive only when it occurs among executive directors and the estimated threshold value is 0.286 (see Fig. 2). Note that, since age is a continuous variable, its diversity is measured using a coefficient of variation. Unlike the Blau index for gender diversity, the values of the coefficient of variation are not limited to one.

Considering that the mean age diversity among executive directors stands at 0.128, it follows that companies stand to gain from increasing this factor among executive directors. Among independent and non-executive directors, however, the advantage is to be gained by reducing age diversity, given its associated adverse effects on market performance.

Hence, the empirical evidence partially supports Hypothesis H2a, being confirmed only for executive directors, while being significantly linearly negative for independent and non-executive directors, thus refuting H2b. Age diversity therefore appears to have a significantly positive impact on strategic decision-making, despite having a notably negative effect on monitoring. This negative influence appears to outweigh the positive effect, especially when pertaining to independent directors.
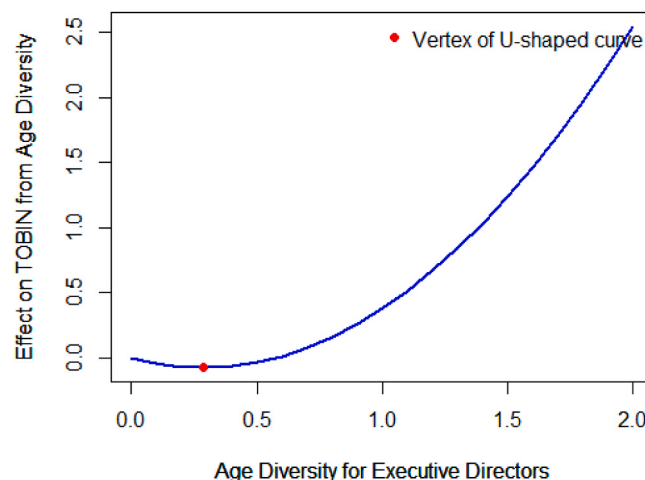

Fig. 2. Graph of the U-Shape relationship between performance and age diversity for Executive Directors.

4.2.3. Diversity of tenure (d3)

Tenure diversity, as can be seen from Table 8, is negative when pertaining to executive and independent directors and non-significant if pertaining to non-executives. Tenure diversity is therefore not desirable when judged from the perspective of the agency or resource dependence theories, where its only influence is to undermine group cohesion and create conflict, and its ultimate impact on firm performance is deemed to be negative or null at best.

The empirical findings do not align with Hypothesis H3a, as the data show no significant linear or quadratic effects with respect to either non-executive or independent directors. H3b is supported, as tenure diversity among executive directors significantly hampers their prime role as strategic decision-makers, thereby undermining performance.

Remarkably, the assumption of varying effects based on directors' roles appears valid, with tenure diversity showing non-significance for non-executives, whose functions are mainly supervisory. This observation, while not fully supporting the hypotheses, is consistent with theoretical perspectives on the subject, suggesting that monitoring is the mediation mechanism for any positive effect on performance, despite potentially impairing cohesion and decision-making.

In this case, the evidence aligns with social-psychology theories, in the sense that a tenure-diverse board has a negative impact on performance by creating cohesion problems particularly affecting strategic decision-making (given its non-significance in relation to non-executives, whose main role is monitoring).

In conclusion, companies stand to benefit from reducing tenure diversity among both executive and independent directors. Encouraging diversity of tenure for non-executives may improve board oversight quality, but the potential boost to financial performance is offset by impairments in communication, cohesion, and shared language.

Table 8
Panel regression fixed effects of diversity of tenure on market performance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	d3	d3QR	ed3	ed3QR	ned3	ned3QR	id3	id3QR
INTANGIBLE	.097	.097	.165	.165	−.095	−.095	.159	.159
	(.365)	(.367)	(.246)	(.246)	(.556)	(.558)	(.153)	(.153)
SIZE	.387***	.386***	.416***	.416***	.353***	.353***	.377***	.377***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
BSIZE	.044	.043	.071	.071	.000	.000	.048	.048
	(.336)	(.348)	(.234)	(.234)	(.999)	(.995)	(.35)	(.346)
BIND	−.065	−.065	−.086	−.086	.197**	.197**	−.070	−.069
	(.241)	(.238)	(.216)	(.215)	(.016)	(.016)	(.327)	(.33)
BOWN	−.113	−.115	−.120	−.120	.076	.076	−.033	−.033
	(.258)	(.252)	(.348)	(.348)	(.548)	(.546)	(.755)	(.756)
CEOOWN	.002	.002	.005**	.005**	−.005*	−.005*	−.002	−.002
	(.363)	(.363)	(.036)	(.036)	(.073)	(.073)	(.495)	(.495)
NCOMM	−.008	−.009	−.0110	−.0110	−.001	−.001	−.010	−.010
	(.419)	(.401)	(.412)	(.412)	(.964)	(.964)	(.364)	(.364)
T5SHARE	−.104	−.104	−.087	−.087	.067	.067	−.117*	−.118*
	(.113)	(.114)	(.311)	(.311)	(.437)	(.436)	(.093)	(.092)
DEBT	−1.202***	−1.202***	−1.381***	−1.381***	−1.123***	−1.123***	−1.175***	−1.175***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
lAGE	.099***	.097***	.105***	.105***	.049*	.049*	.098***	.098***
	(.000)	(.000)	(.000)	(.000)	(.068)	(.072)	(.000)	(.000)
d3	−.077**	−.009						
	(.018)	(.929)						
d3QR		−.045						
		(.465)						
ed3			−.053*	−.054				
			(.093)	(.576)				
ed3QR				.001				
				(.986)				
ned3					−.023	−.015		
					(.448)	(.859)		
ned3QR						−.007		
						(.911)		
id3							−.079***	−.093
							(.006)	(.260)
id3QR								.012
								(.854)
_cons	−1.272***	−1.28***	−1.53***	−1.529***	−1.251***	−1.251***	−1.244***	−1.245***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Observations	12,288	12,288	8,640	8,640	5,902	5,902	11,333	11,333
R^2	.088	.088	.082	.082	.126	.126	.084	.084

p-values are in parentheses
*** p<.01, ** p<.05, * p<.1

4.2.4. Education diversity (d4 and d5)

As can be seen from Tables 9 and 10, the results for diversity of educational discipline does not exactly match our hypothesis, since the data disaggregated by director type show a significant positive effect when there is a low proportion of executives and prove non-significant in the presence of independent board members (outsiders). Despite the observed positive linear effect in relation to executive directors, there is insufficient evidence to support a potential U-shaped effect of this specific diversity parameter, as the quadratic effect appears to be non-significant. Furthermore, the non-significant effect of diversity of education among independent directorsR enables only partial confirmation of H4a. Meanwhile, H4b can be accepted, as the results indicate a non-significant impact in relation to non-executive directors.

The fact that education diversity is positive only in relation to executives (it has a positive significant coefficient) is sufficient to support the idea that strategic management is its main pathway (in line with the resource dependence theory).

The limited significance of the coefficients, particularly when diversity coefficients are examined separately for each director type, prevents us from drawing any practical implications for practitioners. If anything, the ambiguity in the results underscores the need to use more comprehensive measures of educational breadth. The current measure focuses uniquely on financial expertise since data constraints prevented the consideration of any other type.

In accordance with Hypothesis H4c, empirical evidence suggests that diversity of educational attainment among board members does not significantly influence a company's market performance, either positively or negatively.

4.2.5. Nationality diversity (d6)

Table 11 shows that diversity of nationality is, overall, non-significant as an explanatory variable for market performance, although

Table 9
Panel regression fixed effects for the discipline diversity of board members on market performance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	d4	d4QR	ed4	ed4QR	ned4	ned4QR	id4	id4QR
INTANGIBLE	.089	.091	.091	.092	.328**	.329**	.104	.103
	(.403)	(.396)	(.442)	(.434)	(.012)	(.012)	(.335)	(.338)
SIZE	.386***	.386***	.395***	.394***	.340***	.340***	.376***	.376***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
BSIZE	.035	.038	.002	−.004	−.027	−.028	.012	.009
	(.44)	(.395)	(.961)	(.927)	(.631)	(.623)	(.798)	(.852)
BIND	−.064	−.065	−.048	−.039	.222***	.223***	−.082	−.088
	(.237)	(.234)	(.422)	(.513)	(.003)	(.003)	(.207)	(.18)
BOWN	−.108	−.108	−.098	−.096	−.038	−.038	−.108	−.107
	(.277)	(.276)	(.358)	(.368)	(.741)	(.743)	(.282)	(.288)
CEOOWN	.001	.001	.002	.002	.000	.000	.002	.002
	(.456)	(.455)	(.361)	(.353)	(.947)	(.946)	(.436)	(.437)
NCOMM	−.008	−.008	−.009	−.009	.001	.001	−.007	−.008
	(.413)	(.415)	(.402)	(.390)	(.938)	(.938)	(.475)	(.464)
T5SHARE	−.103	−.104	−.110	−.109	−.055	−.055	−.107	−.106
	(.115)	(.109)	(.117)	(.120)	(.468)	(.467)	(.108)	(.112)
DEBT	−1.199***	−1.199***	−1.233***	−1.233***	−1.161***	−1.161**	−1.18***	−1.18***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
lAGE	.092***	.091***	.102***	.102***	.057**	.057**	.096***	.095***
	(.000)	(.000)	(.000)	(.000)	(.014)	(.014)	(.000)	(.000)
d4	−.089**	−.241						
	(.038)	(.142)						
d4QR		.119						
		(.337)						
ed4			.037	.264*				
			(.124)	(.063)				
ed4QR				−.241				
				(.104)				
ned4					.018	.033		
					(.487)	(.799)		
ned4QR						−.016		
						(.907)		
id4							−.023	.035
							(.332)	(.695)
id4QR								−.059
								(.504)
_cons	−1.200***	−1.165***	−1.293***	−1.28***	−1.011***	−1.01***	−1.147***	−1.14***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Observations	12,462	12,462	11,388	11,388	8,838	8,838	12,162	12,162
R^2	.088	.088	.088	.088	.096	.096	.084	.084

p-values are in parentheses
*** p<.01, ** p<.05, * p<.1

Table 10

Panel regression fixed effects for diversity of educational attainment on market performance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	d5	d5QR	ed5	ed5QR	ned5	ned5QR	id5	id5QR
INTANGIBLE	−.125	−.124	−.239	−.236	.025	.035	−.179	−.178
	(.295)	(.298)	(.271)	(.278)	(.934)	(.908)	(.192)	(.195)
SIZE	.464***	.464***	.589***	.588***	.284***	.282***	.406***	.407***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
BSIZE	.059	.063	.261***	.260***	.082	.093	.054	.051
	(.273)	(.242)	(.006)	(.007)	(.448)	(.392)	(.410)	(.441)
BIND	−.072	−.071	.012	.013	.205	.191	−.174**	−.177**
	(.211)	(.216)	(.908)	(.898)	(.138)	(.169)	(.027)	(.025)
BOWN	−.331***	−.331***	−.611***	−.61***	−.149	−.148	−.384***	−.383***
	(.002)	(.002)	(.001)	(.001)	(.438)	(.441)	(.002)	(.002)
CEOOWN	.003	.003	.01***	.01***	−.008*	−.008*	.000	.000
	(.248)	(.244)	(.003)	(.003)	(.081)	(.086)	(.986)	(.986)
NCOMM	−.003	−.003	.000	.000	.034*	.034*	.001	.001
	(.807)	(.787)	(.981)	(.977)	(.077)	(.081)	(.941)	(.933)
T5SHARE	−.057	−.059	−.22*	−.213	−.007	−.003	−.152*	−.148*
	(.406)	(.390)	(.096)	(.106)	(.959)	(.984)	(.053)	(.059)
DEBT	−1.188***	−1.188***	−1.265***	−1.266***	−.926***	−.927***	−1.029***	−1.029***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
lAGE	.067***	.07***	.12***	.124***	.011	.015	.050**	.049**
	(.001)	(.001)	(.002)	(.001)	(.780)	(.709)	(.038)	(.043)
d5	.045	−.134						
	(.414)	(.401)						
d5QR		.337						
		(.233)						
ed5			.006	−.242				
			(.945)	(.392)				
ed5QR				.461				
				(.353)				
ned5					−.062	−.297		
					(.445)	(.224)		
ned5QR						.432		
						(.307)		
id5							.028	.125
							(.570)	(.375)
id5QR								−.178
								(.463)
_cons	−2.032***	−2.035***	−3.509***	−3.508***	−.951**	−.964**	−1.565***	−1.565***
	(.000)	(.000)	(.000)	(.000)	(.025)	(.023)	(.000)	(.000)
Observations	8,602	8,602	2,981	2,981	2,615	2,615	6,230	6,230
R^2	.126	.126	.141	.141	.115	.115	.100	.100

p-values are in parentheses

*** p<.01, ** p<.05, * p<.1

it has a significant negative quadratic effect in relation to executive directors, and also a negative effect on the linear term for independents when the quadratic diversity term is included in the model, indicating that greater diversity of nationality among executive directors would hinder market performance.

Although it appears partially true, Hypothesis H5 is not fully supported by the evidence, as heterogeneity of nationality impacts negatively through executive and independent directors and non-significantly through independent directors.

In line with Ruigrok et al. (2007), where, on the basis of data for Swiss firms, it is suggested that directors of different nationalities tend to be more independent, it appears that monitoring is the role least affected by heterogeneity of nationality. However, contrary to our hypothesis, its impact also appears to vary with the type and role of the director, and it is particularly negative when pertaining to executive and independent directors, in which case it can make decision-making extra challenging.

Nonetheless, while the effects of diversity of nationality vary according to country, the results underscore the importance of caution in interpreting the outcomes for potential barriers to communication, especially for executive directors in a European context.

Remarkably, an unexpected non-linear effect emerges with respect to executive directors. Once more, it appears that the role, and consequently the type of director, influences the relationship between diversity and performance. Moreover, this relationship is contingent upon the level of diversity attained (see Fig. 3). In this instance, diversity consistently yields negative outcomes that worsen as diversity increases, the obvious explanation being that communication is more likely to be compromised as the number of nationalities increases.

It is important to note that, in this context, diversity is measured using a normalized Blau index, with values ranging from 0 to 1.

Finally, based on the results for the various diversity parameters among different types of board members, it seems clear that our initial hypothesis, that the effects of diversity depend upon director type, can be accepted.

Table 11

Panel regression fixed effects for the diversity of nationalities on market performance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	d6	d6QR	ed6	ed6QR	ned6	ned6QR	id6	id6QR
INTANGIBLE	.092	.090	.087	.087	.331**	.332**	.104	.102
	(.392)	(.401)	(.459)	(.46)	(.011)	(.011)	(.334)	(.344)
SIZE	.385***	.385***	.396***	.395***	.339***	.339***	.376***	.376***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
BSIZE	.035	.036	.015	.011	−.013	−.016	.015	.020
	(.435)	(.42)	(.755)	(.82)	(.814)	(.778)	(.751)	(.667)
BIND	−.063	−.062	−.055	−.049	.183**	.189**	−.079	−.0700
	(.249)	(.258)	(.353)	(.410)	(.012)	(.01)	(.227)	(.287)
BOWN	−.117	−.116	−.099	−.098	−.044	−.045	−.112	−.111
	(.238)	(.243)	(.353)	(.357)	(.701)	(.692)	(.265)	(.270)
CEOOWN	.002	.002	.002	.002	.000	.000	.002	.002
	(.417)	(.415)	(.358)	(.37)	(.933)	(.919)	(.416)	(.421)
NCOMM	−.008	−.008	−.009	−.009	.000	.001	−.007	−.007
	(.427)	(.417)	(.403)	(.392)	(.973)	(.958)	(.476)	(.476)
T5SHARE	−.101	−.102	−.111	−.112	−.052	−.051	−.105	−.108
	(.119)	(.117)	(.114)	(.110)	(.495)	(.506)	(.114)	(.106)
DEBT	−1.201***	−1.202***	−1.232***	−1.233***	−1.159***	−1.159***	−1.182***	−1.183***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
lAGE	.089***	.090***	.099***	.100***	.057**	.0570**	.094***	.095***
	(.000)	(.000)	(.000)	(.000)	(.013)	(.013)	(.000)	(.000)
d6	−.047	−.129						
	(.119)	(.122)						
d6QR		.096						
		(.292)						
ed6			−.010	.268				
			(.734)	(.105)				
ed6QR				−.302*				
				(.088)				
ned6					−.044	.066		
					(.150)	(.677)		
ned6QR						−.120		
						(.480)		
id6							−.039	−.173*
							(.138)	(.072)
id6QR								.153
								(.147)
_cons	−1.241***	−1.242***	−1.296***	−1.287***	−.998***	−.998***	−1.152***	−1.166***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Observations	12,462	12,462	11,388	11,388	8,838	8,838	12,162	12,162
R^2	.088	.088	.088	.088	.096	.096	.084	.085

p-values are in parentheses

*** p<.01, ** p<.05, * p<.1

The observed differences enable us to conclude that, of all the diversity parameters considered, age and education have a significant positive effect on performance. Age and education work in accordance with the resource dependence theory (better strategic and innovative decision-making) and gender diversity in accordance both with this and with agency theory (better monitoring). However, none of the diversity parameters shows a positive effect on performance when pertaining exclusively to the non-executive board group. Gender diversity is the only one to do so when pertaining to both independent and non-executive board groups, which suggests that the explanatory role of the agency theory is more marginal than that of the resource dependence theory. This matches theoretical predictions but remains empirically untested (Carter et al., 2003; Jensen, 1993; Monks and Minow, 2004). We would conclude that the explanatory role of agency theory is limited to gender diversity.

4.2.6. Diversity with accounting performance proxy

As can be seen in Table 12, a change in the performance proxy produces a slight variation in the results. In line with Haslam et al., (2010) we are able to state that the choice of performance proxy would explain the ambiguity in reported effects. While the effects of diversity in educational discipline and nationality continue to hold, the gender and age diversity effects turn negative and non-significant, respectively.[3] Pending deeper analysis, this change in the results for gender diversity could be explained as a sign of positive market reaction to the incorporation of women, viewed by agency theory as being superior to men in supervisory roles.

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[3] The results with ROE as the performance proxy show no change with respect to those presented for ROA as the proxy and are therefore omitted here for the sake of brevity.
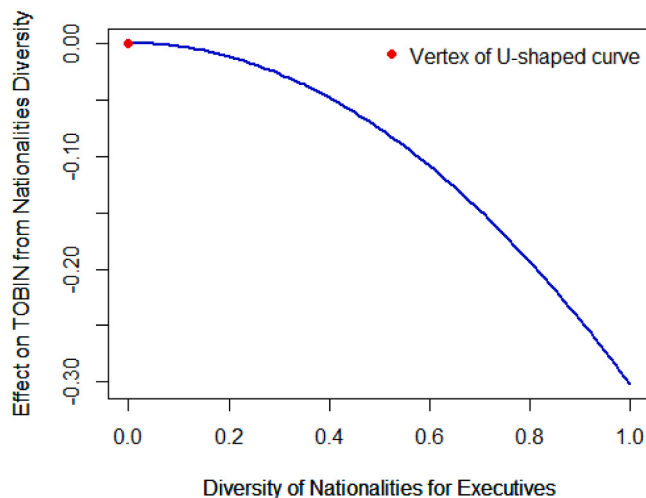
Fig. 3. Graph of the U-Shaped relationship between performance and nationality diversity for Executive Directors.

Table 12
Panel regression fixed effects for diversity with ROA as the dependent variable.

	(1)	(2)	(3)	(4)	(5)	(6)
	d1	d2	d3	d4	d5	d6
INTANGIBLE	.020***	.016***	.019***	.019***	.013*	.019***
	(.000)	(.003)	(.001)	(.001)	(.057)	(.001)
SIZE	.029***	.029***	.028***	.028***	.029***	.028***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
BSIZE	−.004*	.001	−.005**	−.005**	−.005	−.004*
	(.060)	(.706)	(.036)	(.024)	(.140)	(.052)
BIND	−.013***	−.014***	−.014***	−.013***	−.011***	−.014***
	(.000)	(.000)	(.000)	(.000)	(.001)	(.000)
BOWN	.014***	.015***	.014***	.014***	.002	.014***
	(.007)	(.004)	(.007)	(.006)	(.740)	(.007)
CEOOWN	.000	.000	.000	.000	.000	.000
	(.971)	(.378)	(.883)	(.900)	(.342)	(.887)
NCOMM	−.002***	−.001***	−.002***	−.002***	−.001	−.002***
	(.004)	(.009)	(.002)	(.003)	(.140)	(.002)
T5SHARE	−.015***	−.021***	−.016***	−.015***	−.013***	−.015***
	(.000)	(.000)	(.000)	(.000)	(.001)	(.000)
DEBT	−.034***	−.043***	−.034***	−.034***	−.031***	−.034***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
lAGE	−.017***	−.019***	−.018***	−.018***	−.018***	−.018***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
d1	−.004***					
	(.003)					
d2		−.006				
		(.323)				
d3			.001			
			(.754)			
d4				.005**		
				(.028)		
d5					.003	
					(.360)	
d6						−.003*
						(.056)
_cons	−.093***	−.099***	−.087***	−.093***	−.110***	−.089***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Observations	12,343	11,441	12,148	12,343	8,443	12,343
R^2	.092	.109	.090	.091	.086	.091

p-values are in parentheses
*** p<.01, ** p<.05, * p<.1

While a more comprehensive analysis, classifying directors by type, still remains necessary, it is clear that the diversity-performance relationship is also dependent on the choice of performance metric (market-oriented or accounting-based).

5. Conclusions

The results show that the separate consideration of the various board member types is a powerful tool for checking the pathway and main theoretical framework through which board diversity affects firm performance.

We find evidence pointing to a positive effect of gender diversity among independent and non-executive directors, which is U-shaped in the latter case, and a positive effect (also U-shaped) of age diversity among executive directors. Being non-linear and U-shaped, these particular effects support critical mass theories. The data also suggests a positive effect of diversity in academic discipline among executives. For the remaining diversity parameters and board member types, our multi-country evidence suggests that the effect is non-significant or, in some cases (particularly that of tenure diversity), negative.

These results point to resource dependence theory (strategic role of directors) as the main and most dominant explanatory pathway, as only one of the six diversity parameters considered, non-executive gender diversity, has a positive effect, albeit very slight (see Fig. 1). Furthermore, the effect of gender diversity among independent directors who play a dual advisory and strategic role is also positive and has a much larger positive outcome on performance. This is coherent with theory, since, as an asset for monitoring, diversity can easily be substituted by other governance mechanisms such as CEO or board ownership, board compensation structure, debt, or board independence, which is not the case for board diversity as a strategic asset, which is less substitutable. Consequently, Carter et al. (2003) predicts a weaker link between diversity and agency theory, although there is yet no empirical proof for this.

Hence, we suggest that, although diversity should be encouraged, irrespective of potential market effects (as it maximizes stakeholder well-being), board appointments should be made with a view also to maximizing market performance and improving profitability by selecting individuals who are able to contribute to the diversity of background, skills and experience required for the successful accomplishment of the various tasks required of the board. It has also been shown that, according to which type of board member they pertain, certain aspects of diversity may actually hinder firm performance. A one-size-fits-all approach would therefore be the wrong choice for regulators and board selection committees, because, while diversity has a positive effect with respect to certain firm attributes and director types, it can be negative with respect to others.

Specifically, as per the implications for practitioners, the data suggests that, on average, companies would benefit from enhancing gender diversity among the non-executive and independent directors on their boards and by promoting age diversity among executive directors. With respect to tenure diversity, meanwhile, the best approach is minimization, since this form of diversity generates more communication issues than any other. However, caution is required before poor communication is attributed to diversity of nationalities, especially when the diversity pertains to independent and executive directors.

A further contribution of this paper is to base the choice of model variables on the hypothesized dominant pathway for the diversity-performance relationship. Taking monitoring to be the main pathway, as claimed by the agency theory, variables such as debt, the board's ownership share, CEO power or board independence could effectively moderate the relationship between diversity and performance. However, based on the resource dependence theory, whereby the main pathway is through the strategic role of board members, other variables, such as innovation intensity, industry, R&D expenditure or even the firm's legal environment could prove useful as mediators in future studies. As our evidence leans towards the resource dependence theory, the latter set of variables might be the best choice of mediators for future research.

The possible limitations of this study relate to the aforementioned sources of ambiguity. For example, despite its multi-country focus, generous time span including a world financial crisis, and different industry structures, diversity patterns, and legal systems, our sample remains biased by covering only European countries, such that our results may not be extrapolated to developing countries. In other international landscapes, such as Asia or South America, the role of board diversity could plausibly be conditioned by any number of specific corporate context factors. Thus, future research on other geographical or economic development levels could usefully check the validity of our findings.

Further research into the moderating variables and mediators would also be worthwhile. According to theorists, possible candidates as moderators include innovation intensity, board configurations, and percentages of board and CEO ownership, which are not studied in detail in this paper, under the self-evident assumption that, in a broad multi-country sample, any mediators would balance each other out and thus minimize their net effect in the relationship of interest.

Finally, data availability issues hampered the definition of the education diversity variables in the sample, where breadth is defined based on heterogeneity of financial expertise, and depth on heterogeneity of attainment. The former of these could be redefined in future studies by adding to or replacing financial expertise with expertise in other fields and redefining the term "skill set". This might explain why the evidence for diversity in academic discipline is weaker than anticipated and found positive only in relation to executive directors and when including the quadratic term.

CRediT authorship contribution statement

Juan Antonio Rodríguez-Sanz: Writing – review & editing, Supervision, Project administration, Funding acquisition, Formal analysis, Conceptualization. **Fernando Tejerina-Gaite:** Writing – review & editing, Supervision, Project administration, Funding acquisition, Formal analysis, Conceptualization. **Fernando Hernández-Atienza:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

None.

Data Availability

The authors do not have permission to share data.

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