Age Diversity: An Empirical Study in the Board of Directors

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This study aims to explore how board age diversity affects corporate performance. This study develops three hypotheses built on the perspective of the upper echelons and Harrison and Klein’s (2007) diversity typology. Focusing on age diversity and using a board of directors as a unit of analysis, this study empirically tests the effects of each type of age diversity on corporate performance in a sample of European listed firms for the year 2009. This study advances the understanding of board behavior and its relationships with corporate results, and presents a new approach to study age diversity from an integrated point of view.

KEYWORDS age diversity, board of directors, corporate governance, corporate performance

INTRODUCTION

In view of the seriousness of the current economic situation, a large number of supranational and national organizations have reviewed their recommendations and corporate governance codes with the aim of increasing the effective application of corporate governance mechanisms. In this context, the board of directors is one of the most significant governance issues under review by the corporate governance initiatives. Because the most recent financial crisis has revealed serious weaknesses of this body to fulfill its duties.
A common recommendation for improving board effectiveness concerns the diversity of boards. For instance, the European Commission, in a working document entitled “Corporate Governance in Financial Institutions: Lessons to be Drawn from the Current Financial Crisis, Best Practices” argues that diversity broadens the debate within boards and helps to avoid the danger of narrow “group think.” Generally, the selection of candidates seems to have drawn on a too-narrow pool of people. As a consequence, there has been a lack of diversity of views within boards, which might, in some cases, have contributed to the board members to effectively challenge management decisions (COM 2010, p. 8). However, in the academia world, the results of research on the association between top management team diversity and corporate performance have been inconclusive (Nielsen 2010). In this sense, this study expects to contribute to the understanding of board diversity and examines how it might affect corporate performance.

Authors Campbell and Minguez-Vera (2008), Mahadeo et al. (2012), and Nielsen (2010) frequently use the term “diversity” as a synonym of heterogeneity, dispersion, difference, a good mix of attributes, etc. This study, following Harrison and Klein (2007), uses the term diversity to describe the distribution of differences among the members of a unit with respect to a common attribute. In the literature, the main unit of analysis is the top management team; however, the definition of the top management team also differs widely among studies (Nielsen 2010). In this study, the unit of analysis is the board of directors, because it is a key corporate governance mechanism, and it is ultimately responsible for the correct performance and success of a firm (Bhagat and Bolton 2008).

Harrison and Klein (2007) point out that diversity can be defined in three different ways: diversity as separation, variety, and disparity, and each type of diversity might have different effects on corporate performance. In particular, they explore the typology’s implications for the special case of demographic diversity, showing that the same demographic attribute within units may be conceptualized as separation, variety, or disparity. In this vein, the attribute “age” remains as one of the most important demographic variables in examining the issue of board diversity. According to Kang et al. (2007), there is an active promotion of age diversity in boards to encourage the different perspectives of different age groups and as an integral part of succession planning. Indeed, the European Commission recommends increasing age diversity, among others, and remarks that, “Resulting from the experiences and knowledge that different age groups bring to the board, increasing levels of age diversity may improve the overall level of knowledge on the board” (COM 2010, p. 11).

However, prior findings of limited studies on the relationship between age diversity and corporate performance are inconsistent. Some studies report positive effects of age diversity on performance (Kilduff et al. 2000; Mahadeo et al. 2012), whereas others find either no significant effects
(Bunderson and Sutcliffe 2002; Zimmerman 2008) or negative effects (Murray 1989; Milliken and Martins 1996). A possible explanation of these inconclusive findings could be that previous research has omitted the interactions among different aspects of diversity. In fact, in a review of theories and methodologies of top management team diversity, Nielsen (2010) highlights that the distinction of diversity as variety, separation, and disparity (Harrison and Klein 2007) needs to be applied to future research.

In this context, this study aims to test empirically the theoretical consequences built on Harrison and Klein’s (2007) diversity typology. In particular, the main purpose is to examine how age diversity on a board, in terms of separation, variety, and disparity, affects corporate performance. This article expects to contribute to the existing corporate governance literature, business practice, and public policy in several ways. First, this study contributes to the theoretical understanding of board diversity and the consequences on corporate performance, because it integrates psychologists’ and sociologists’ theories with a management and economic orientation. Second, it empirically explores novel measures of age diversity of the boards that reflects different types of diversity. Third, this study also examines the impact of the three forms of diversity simultaneously with the aim to isolate, and, hence, analyze the opposite effects of different diversity types on strategic behavior and performance. Fourth, in light of the corporate governance guidelines that recommend increased board diversity, this article brings new evidence about the three types of diversity and the finding suggests encouraging board age diversity as variety in order to adopt different views and make more deliberate decisions by the board, which improves corporate performance.

This article is divided into five sections. After this introduction, a review of the theoretical framework is provided. “Data and Methodology” includes information on the samples, variables, and methodology used in estimating the model. “Empirical Results” presents the findings and empirical analysis. The final section summarizes and concludes the study.

THEORETICAL FRAMEWORK

Theory and Hypotheses Development

The upper echelon theory has received wide interest in the field of organization behavior. A seminal article of this theory is the publication of Hambrick and Mason in 1984 titled “Upper Echelons: The Organization as a Reflection of Its Top Managers.” Hambrick and Mason (1984) propose a model of how upper echelon characteristics might become reflected in organizational outcomes. They argue that complex decisions, such as strategic choices, are largely the outcome of behavioral factors rather than a mechanical quest for economic optimization. Given the great difficulty obtaining conventional psychometric data on top executives, Hambrick and Mason (1984) suggest to
use observable demographic managerial characteristics as valid proxies of executives’ cognitive frames. Another relevant idea introduced by Hambrick and Mason (1984) is that an analysis of the characteristics of the top management team allows stronger explanations of organizational outcomes than an analysis of the individual characteristics of the top executive alone (Hambrick 2007).

However, recent research on understanding the complex roles played by top managers and top management teams requires applying alternative theories in combination with the perspectives of the upper echelons in order to find the answer to the fundamental question of whether heterogeneity in top management team composition contributes to firm strategy and performance (Nielsen 2010). In this vein, the role of individual psychological factors and team processes on executive decision-making have led to wider application of group psychology and sociology theories combined with upper echelons theory.

The research question in this article is to examine empirically the effect of diversity as separation, variety, and disparity on corporate performance. To that end, three hypotheses are developed based on upper echelon theory, which states that the aggregate characteristics of top management teams have influence over corporate performance, and the new directions for diversity theory proposed by Harrison and Klein (2007).

Diversity as separation, which refers to differences in position or opinion among unit members, is closely related to theories of similarity attraction (Byrne 1971; Clore and Byrne 1974), social identity and self-categorization (Tajfel and Turner 1979; Hogg and Terry 2000). These theories posit that individuals are attracted to others with similar attributes to themselves and greater similarity presumably leads to shared results, fewer disagreements and conflicts, higher levels of cooperation and cohesion, trust, and social integration. Therefore, relationships among similar individuals make it possible to reach a consensus more easily and make decisions efficiently. Consequently, the following theoretical hypothesis is proposed:

**Hypothesis 1.** A greater separation leads to a lower level of corporate performance.

Diversity as variety indicates differences in kind or category, knowledge, or experience among unit members. In this case, information processing theory (Ashby 1956) and human cognition theory (Campbell 1960) assume that teams whose members draw from different pools can translate greater information richness within a unit into better choices, plans, or products delivered from different views and, thus, make more effective decisions. Based on these arguments, the following hypothesis is expected:

**Hypothesis 2.** A greater variety leads to a higher level of corporate performance.
Diversity as disparity represents differences in concentration of valued social assets of resources such as pay, power, prestige, and status among unit members. This third perspective builds on the distributive justice theory (Adams 1963; Deutsch 1985), tournament theory (Lazear and Rosen 1981; Lazear 1995), and stratification, status hierarchy or characteristics theories (Blau 1960; Berger et al. 1977). The basic idea of this perspective is that when a few members on a team have a marked influence over the group decision, they control the flow of information, impose their views, and limit a democratic participation in the team. Likewise, low-status members tend to be conformist and contribute less to the team performance. Consequently, the decisions are made in worse conditions and it negatively impacts corporate performance. Therefore, the following hypothesis is presented:

**Hypothesis 3.** A greater disparity leads to a lower level of corporate performance.

Antecedents and Outcomes of Age Diversity

Harrison and Klein (2007) argue that some team attributes are strongly related to a particular type of variety. For instance, pay is a good proxy of diversity as disparity, because its structure captures the differences in the power of the members in a team; or functional background seems to be a form of disparity as variety, because it shows qualitative differences in the kinds of information held by team members. However, these authors also remark that demographic variables most frequently included in diversity studies, such as age, sex, race, organization, and team tenure may be meaningfully conceptualized as separation, as variety, or as disparity.

In this context, this study focuses on age diversity. As remarked Shore et al. (2009), the research on age diversity is much less developed than research on race and gender, suggesting the need for new paradigms and new approaches to studying age diversity. Moreover, in spite of the growing number of international initiatives that encourage age diversity to improve the overall level of knowledge on the top management team, its potential effects on performance are not yet fully understood (Kunce et al. 2011), and the limited empirical studies show inconclusive results.

The theoretical arguments for promoting age diversity on top management teams are mixed. Murray (1989) highlights that a homogenous board (minimum level of diversity) is made up of individuals who share similar values, which ensures better goal congruence and communication. However, Houle (1990) argues that a heterogeneous board can ensure that a more efficient division of labor operates at board level, with the older group providing the experience, the network, and the financial resources; the middle-aged group in charge of the main executive responsibilities; and a younger group learning and developing its knowledge of the business.
In this vein, Mahadeo et al. (2012) remark that a homogenous board may encourage complacency, cronyism, lack of interest in new strategies, and decisions based on compromises.

Prior findings of limited empirical studies on the effect of age diversity of top management teams on corporate performance are inconsistent. Mahadeo et al. (2012) examined data from the 2007 annual reports of 42 companies listed on the Stock Exchange of Mauritius and found that age diversity positively impacts short-term performance. Likewise, Kilduff et al. (2000), using data from 35 simulated firms run by a total of 159 managers attending executive education programs, found evidence that age heterogeneity of team members positively affects overall performance. However, some studies find no significant effects between age diversity and corporate performance. Bunderson and Sutcliffe (2002) collect data from the management team members of business units in a Fortune 100 consumer products company, and the findings show that age diversity does not affect unit performance. Zimmerman (2008) examines the relationship between top management heterogeneity and the capital raised by the firm through its initial public offering. He finds that heterogeneity in functional background and educational background is associated with greater capital amounts raised; however, he does not find that age heterogeneity is significant in raising funds at initial public offerings. Other studies have reported negative effects on performance. Murray (1989) identifies elements related to age and years of experience, which he conceptualizes as temporal heterogeneity in 84 US food and oil companies and finds a negative correlation between this variable and short-term performance. Milliken and Martins (1996) review and evaluate management research on the effects of different types of diversity in group composition at various organizational levels and remark on several empirical studies (Cummings et al. 1993) that report negative effects of age diversity on performance.

As Nielsen (2010) suggests, it is possible that the inconclusive findings of previous research result from the fact that interactions between different aspects of diversity are omitted. This author also highlights that the distinction between diversity as variety, separation, and disparity (Harrison and Klein 2007) needs to be applied to future research. In this context, this study expects to contribute to theoretical and empirical understanding of board diversity by means of testing, the different effects of age diversity as separation, variety and disparity on corporate performance.

**DATA AND METHODOLOGY**

**Sample**

The sample selection process starts with firms listed in FTSE 100, FTSE SMALL CAP, DAX 30, and CAC 40 for year 2009. Data on board characteristics are
from Asset4 database (Thomson Reuters), and data on financial items are from Worldscope. Given the limitation of available data, the final sample consists of 2,152 individual observations of directors’ characteristics. These directors are members of 205 boards. Therefore, this empirical study uses data from 205 European listed firms.

Variables

DEPENDENT VARIABLES

This study examines how age diversity of the board directors affects corporate performance. Consistent with previous studies (Cheng 2008; Cornett et al. 2009), the corporate performance variable (PERFORMANCE) is estimated by an accounting performance measure; specifically, earnings before interests and taxes divided by book value of total assets (EBITA). This study also considers a proxy for accounting performance, removing the influence of the home country and industry performance. Therefore, the country- and industry-adjusted EBITA is defined as the difference between a firm’s EBITA and the average EBITA across all listed firms in the same two-digit SIC and from the country in which the company is registered (Cheng 2008; Faccio et al. 2011). Note that the averages of EBITA for each industry and country have been calculated for all firms listed in London, Frankfurt, and Paris Stock Exchanges; that is 3911 firms in total.

INDEPENDENT VARIABLES

Harrison and Klein (2007) explain implications for research design; in particular, they suggest appropriate operationalization for each type of diversity (DIVERSITY). Following their suggestions, this study uses different measures of age diversity as separation, variety, and disparity.

Figure 1 is a graphic illustration of the three empirical levels—minimum, median, and maximum—of the variables used as proxies of the three types of diversity, using the sample of this study. Ferrero-Ferrero et al. (2012) measured diversity by standard deviation of the age of directors, Blau’s Index of directors’ generation, coefficient of variation of the age, and coefficient of variation of director’s pay. This study extends the previous one by also examining interquartile range of age and Teachman’s Index of directors’ generation as diversity measures.

Diversity as separation is considered as a continuous variable. Maximum occurs when there are two subgroups divided but balanced within a team and each subgroup takes opposite stances, thus both subgroups show disagreement and opposition between themselves. Age diversity as separation (AGE SEPARATION) is measured by standard deviation of the age of directors who are members of the board. However, Figure 1 shows that this
measure does not follow the theoretical pattern in the maximum empirical level of age diversity as separation. Therefore, additionally, this study uses the interquartile range to measure the diversity as separation, which seems to better fit the theoretical pattern.

**FIGURE 1** Illustrations of the empirical levels of age diversity as separation, variety, and disparity.
Diversity as variety is a categorical attribute. Focusing on age, this variable represents differences in personality, traits, skills, attitudes, mental health, work values, and behaviors. These differences may be categorized according to the generations, because the social and historical experiences and circumstances from a respective generation have influenced the individuals’ behaviors. There is a strong consensus among scholars (Suvillan et al. 2009; Twenge et al. 2010) about the four major generations of the 20th century: the Greatest Generation (1922–1945), Boomers (1946–1964), Xers (1965–1983), and Generation Y (1984–2002). Suvillan et al. (2009) and Twenge et al. (2010) argue that members of the Greatest Generation are self-disciplined, believe in self-sacrifice and traditional values, and they are extremely loyal employees. The next generation, Boomers, thinks that hard work and effort will lead to success, values extrinsic measures of career success, develops a distrust of authority, and places a high value on independent thinking. Xers are influenced by the financial, family, and societal insecurities that dominated their childhoods. They lack solid traditions but are highly mobile and are accustomed to rapid change. They learn quickly, embrace diversity, and like informality. Despite the characteristics of the youngest generation being less clear, Twenge et al. (2010) remark that they have grown up with the Internet, and they are accustomed to getting access to information quickly.

This study uses these generations as a qualitative distinction to define the different categories. Note that any member belongs to the Generation

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**FIGURE 1** Continued.
Y, thus age diversity as variety is measured by three categories based on
generations: the Greatest Generation (64–87), Boomers (45–63), and Xers
(26–44). The age of the directors has been calculated using 2009 as base year.
Following previous studies (Campbell and Minguez-Vera 2008; Miller and
Triana 2009; Talke et al. 2010) and according to the properties of this variable
(Harrison and Klein 2007), this study uses two indices to calculate age
diversity as variety (AGE VARIETY). The first is the Blau’s Index (1977) that
is calculated by Equation 1, where \( k \) is a particular category (generation) and \( P_k \) is the proportion of directors of a particular category within the board.

\[
\text{Variety} = 1 - \sum_{k=1}^{3} P_k^2
\]  

(1)

This index has been divided by its theoretical maximum with the aim of
standardizing the results and making the interpretation of the index easier.
The second measure is the Teachman’s index (1980), calculated as Equation
2 shows, where \( P_k \) is again the proportion of directors in the \( k \) category.

\[
\text{Variety} = -\sum_{k=1}^{3} P_k \cdot \ln(P_k).
\]  

(2)

The minimum theoretical variety occurs when all members belong to the
same category. In this study, this is the case of 31 boards of directors, because
all members of the board belong to the same generation, in particular the
Boomers, except a board whose members belong to the Greatest Generation.
Harrison and Klein (2007) highlight that the maximum theoretical variety is
when each member within a unit comes from a unique category. However,
this maximum implies that all boards have the same size and there are
as many categories as directors. Given that the data does not fulfill both
conditions, the maximum empirical variety is maximized when the three
categories are present on a board in equal proportions.

Diversity as disparity is a continuous variable that represents the
differences in concentration of power and status in a board. Disparity reflects
both the distances among members and the dominance of whoever has
higher amounts of a particular attribute. This asymmetry is captured by the
coefficient of variation, which has been used in previous studies to measure
disparity (Siegel and Hambrick 2005). Age diversity could be treated as
disparity because age can be positively associated with authority and
empowerment, because older members might be seen as possessing higher
levels of task-relevant experience and tacit knowledge (Harrison and Klein
2007). Therefore, the proxy proposed to measure age disparity (AGE
DISPARITY) is the coefficient of variation of the age of the board members.
However, focusing on a board of directors as a unit of analysis, maybe age is
not a good proxy of power. As Kang et al. (2007) suggest, most of the older directors are ex-managers from various corporations who enjoy their retirement by sitting on boards of various companies. This study uses a second measure of disparity that seems to fit better the distribution of power on the board. That is the coefficient of variation of director’s pay (PAY DISPARITY). Note that the director’s pay has been measured by the salary and fee of the director.

CONTROL VARIABLES

Consistent with previous empirical research (Cheng 2008; Miller and Triana 2009), the firm-specific variables that could affect corporate performance are the natural log of total assets as an indicator for size (SIZE); capital expenditures divided by sales as proxy for investment ratio (CAPEX); total debt per unit of total assets as a proxy for capital structure (LEVERAGE); annual growth rate of sales as indicator of growth (GROWTH); and current assets to current liabilities as proxy for liquidity (LIQUIDITY). Additionally, dummy variables are considered to reflect differences among countries (COUNTRY), and industries (INDUSTRY) using a one-digit SIC.

Methodology

In order to test the hypotheses, this study estimates the linear regression model presented in Equation 3.

\[
\text{PERFORMANCE}_i = \beta_0 + \alpha_1 \cdot \text{DIVERSITY}_i + \beta_1 \cdot \text{SIZE}_i + \beta_2 \cdot \text{CAPEX}_i \\
+ \beta_3 \cdot \text{LEVERAGE}_i + \beta_4 \cdot \text{GROWTH}_i + \beta_5 \cdot \text{LIQUIDITY}_i \\
+ \sum_{j=1}^{2} \lambda_j \cdot \text{COUNTRY}_i + \sum_{k=0}^{7} \lambda_k \cdot \text{INDUSTRY}_i + \mu_i
\]  

(3)

Consistent with previous research (Campbell and Minguez-Vera 2008; Mahadeo et al. 2012), this equation includes corporate performance as the dependent variable, which is explained by board diversity and control variables. The board diversity variable specified in Equation 3 is divided into the three types of diversity—separation, variety, and disparity—to test their effects on corporate performance.

Given the feature of the sample, Equation 3 is regressed by means of OLS. The estimator process uses a robust variance matrix, in particular, White-corrected standard errors in presence of heteroskedasticity. Additionally, the issue of collinearity is explored by means of the variance inflation factors for the independent variables. Note that Equation 3 does not include the board size variable because it presents problems of collinearity because it is strongly correlated with firm size variable.
EMPIRICAL RESULTS

Descriptive Statistics

The 205 firms of the sample are from three European countries: United Kingdom (148 firms), Germany (26 firms), and France (31 firms). Table 1 provides descriptive statistics for the sample. The measures of corporate performance indicate that the firms in the sample achieved a good rate of

| Variable (PROXY) | Mean  | SD    | Min.   | 25th P. | Median | 75th P. | Max.  |
|-----------------|-------|-------|--------|---------|--------|---------|-------|
| PERFORMANCE (EBITA) | 5.8498 | 9.0976 | -28.8477 | 1.6438 | 5.8863 | 10.4546 | 56.7068 |
| AGE DIVERSITY AS SEPARATION (Standard Deviation) | 7.2898 | 2.0866 | 1.2248 | 5.8310 | 7.0225 | 8.5049 | 14.4706 |
| AGE DIVERSITY AS SEPARATION (Interquartile range –years-) | 9.6538 | 3.7206 | 1.5000 | 7.0000 | 9.2500 | 12.0000 | 23.0000 |
| AGE DIVERSITY AS VARIETY (Blau’s Index) | 0.5741 | 0.2487 | 0.0000 | 0.4167 | 0.6300 | 0.7456 | 0.9796 |
| AGE DIVERSITY AS VARIETY (Teachman’s Index) | 0.6087 | 0.2661 | 0.0000 | 0.4506 | 0.6365 | 0.8018 | 1.0790 |
| AGE DIVERSITY AS DISPARITY (Coefficient of Variation) | 0.1284 | 0.0377 | 0.0204 | 0.1014 | 0.1241 | 0.1507 | 0.2445 |
| PAY DIVERSITY AS DISPARITY (Coefficient of Variation) | 1.1023 | 0.4122 | 0.2599 | 0.8475 | 0.9806 | 1.2866 | 2.9079 |
| SIZE Ln (total assets) | 7.7807 | 2.3742 | 2.3805 | 5.6566 | 7.6317 | 9.99860 | 5.6266 |
| CAPEX (Capital expenditures/sales) | 4.5773 | 4.0853 | 0.0300 | 1.7400 | 3.3700 | 6.4300 | 21.8500 |
| LEVERAGE (Total debt/total assets) | 26.1023 | 16.1525 | 0.0084 | 14.5144 | 24.6890 | 34.6998 | 106.9120 |
| GROWTH (Annual growth rate of sales) | 1.2876 | 17.8179 | -50.900 | -9.7600 | 0.6400 | 10.8300 | 72.5900 |
| LIQUIDITY (Current assets/current liabilities) | 135.8166 | 80.1010 | 23.4792 | 87.5009 | 121.8047 | 159.4942 | 792.4195 |

The table shows the descriptive statistics of the variables using firms listed in FTSE 100, FTSE SMALL CAP, DAX 30, and CAC 40 for year 2009.
firm value on average—EBITA: 5.85%, but there is a huge variation in the performance variables among the sample firms. With regard to age diversity of the board, it seems that there is a relatively satisfactory level of heterogeneity in terms of age separation, age variation, and age disparity in the sample.

Age Diversity

Tables 2, 3, and 4 report the estimations that test the hypotheses based on accounting performance. Table 2 contains the estimation of regression that uses EBITA as accounting performance, standard deviation of age as separation, and Blau’s Index as variety. Table 3 presents the results using the country- and industry-adjusted EBITA as dependent variables. Table 4 reports in panel A the regression that uses interquartile range to measure the diversity as separation, and panel B exhibits the results using Teacham’s Index as proxy for variety.

Focusing on the effect of age diversity of separation on corporate performance, the results indicate that the coefficient of this variable is not statistically significant. This finding does not support Hypothesis 1 presented in the theoretical framework, which predicted that greater differences in age of directors as separation lead to a lower level of corporate performance. It is observed that only in model (a) is age separation included as age diversity—separation as diversity positively affects corporate performance. However, this relationship weakens when the equation takes into account the effect of other types of diversity; Models (e) and (g).

The results show that age diversity as variety positively impacts corporate performance. Therefore, this study finds empirical evidence to support Hypothesis 2, that is, a greater age diversity as variety leads to a higher level of corporate performance. This finding is in line with Harrison and Klein (2007) who argue that variety broadens the cognitive, behavioral repertoire and views of the board and leads to better choices and improvements in performance.

With regard to diversity as disparity, this study does not find evidence supporting Hypothesis 3. Therefore, the empirical study does not support the theoretical assumption that inequality in terms of power and status of the board of directors leads to a lower level of corporate performance. This relationship is not significant using age disparity or pay disparity. In the case of age disparity, one possible explanation of the finding consistent with Kang et al. (2007) could be that the age is not an attribute that reflects the distribution of power of the board. With respect to the unexpected results related to pay disparity, one explanation could be that larger difference in pay also leads directors to elicit stronger individual efforts. In fact, Henderson and Fredrickson (2001) find a balance between the arguments that “more equal pay” promotes collaboration, greater coordination, and the opposite view that suggests that “larger pay differences” create tournament-like
TABLE 2 Regression of the Relationship Between Corporate Performance (EBITA) and Board Age Diversity

| Independent Variables          | (a) | (b) | (c) | (d) | (e) | (f) | (g) |
|-------------------------------|-----|-----|-----|-----|-----|-----|-----|
| AGE SEPARATION-SD             | 0.44494† |     |     |     |     |     | 0.01924 |
|                               | (0.26030) |     |     |     |     |     |     |
| AGE VARIETY-BLAU              | 6.47194** |     |     | 6.70814* | 6.98151* | 7.92482** |
|                               | (2.36429) |     |     | (2.88581) | (2.84977) | (2.96340) |
| AGE DISPARITY-CV              |     |     | 21.60799 |     | 21.60799 |     | 8.58401 |
|                               |     |     | (15.44931) |     | (15.44931) |     | (18.27085) |
| PAY DISPARITY-CV              |     |     |     |     |     | 1.12297 | 0.94200 |
|                               |     |     |     |     |     | (1.7950) | (1.70433) |
| FIRM SIZE                     | 0.89402* | 0.79065* | 0.90660* | 0.88143* | 0.78028* | 0.76013* | 0.94499* |
|                               | (0.36440) | (0.34767) | (0.36833) | (0.38585) | (0.35967) | (0.36361) | (0.39539) |
| CAPITAL                       | 0.00360 | 0.02332 | 0.00447 | −0.02002 | 0.02375 | 0.02381 | 0.00170 |
|                               | (0.06711) | (0.06101) | (0.06868) | (0.08757) | (0.06109) | (0.06085) | (0.07647) |
| EXPENDITURES/SALES            | −0.12417* | −0.11896* | −0.12448* | −0.11838* | −0.11856* | −0.11786* | −0.11224* |
|                               | (0.05041) | (0.04666) | (0.04997) | (0.05673) | (0.04691) | (0.04675) | (0.04893) |
| SALES GROWTH                  | 0.15122*** | 0.14989*** | 0.15138*** | 0.12309** | 0.14987*** | 0.14983** | 0.11920** |
|                               | (0.03714) | (0.03418) | (0.03732) | (0.03963) | (0.03745) | (0.03754) | (0.03934) |
| LIQUIDITY                     | 0.03424*** | 0.03499*** | 0.03447*** | 0.02940** | 0.03410*** | 0.03390** | 0.03004** |
|                               | (0.00927) | (0.00897) | (0.00929) | (0.01050) | (0.00899) | (0.00898) | (0.01005) |
| CONSTANT/INTERCEPT            | −4.36272 | −4.37083 | −4.04145 | −1.23657 | −4.12427 | −3.73871 | −6.50016 |
|                               | (4.24795) | (3.87366) | (4.35857) | (3.79548) | (4.2346) | (4.3857) | (4.72467) |
| Country Dummies               | Included | Included | Included | Included | Included | Included | Included |
| Industry Dummies              | Included | Included | Included | Included | Included | Included | Included |
| R²                            | 0.2196 | 0.2389 | 0.2170 | 0.2546 | 0.2390 | 0.2392 | 0.3042 |
| F-test                        | 4.20*** | 5.00*** | 4.24*** | 3.03*** | 4.70*** | 4.71*** | 3.85*** |
| N. obs.                       | 205 | 205 | 205 | 205 | 205 | 205 | 205 |

The table reports regression results of corporate performance using OLS estimator. Corporate performance (EBITA) is measured by earnings before interests and taxes divided by book value of total assets, AGE SEPARATION by standard deviation of the age of directors, AGE VARIETY by Blau’s Index, AGE DISPARITY by coefficient of variation of the age of directors, PAY DISPARITY by coefficient of variation of director’s pay, FIRM SIZE by natural log of total assets as an indicator for size, CAPITAL EXPENDITURES/SALES by capital expenditures divided by sales as proxy for investment ratio, LEVERAGE by total debt per unit of total assets as a proxy for capital structure, SALES GROWTH by annual growth rate of sales as indicator for growth, LIQUIDITY by current assets to current liabilities as proxy for liquidity. Robust standard errors are in brackets. †p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001.
### TABLE 3 Regression of the Relationship Between Corporate Performance (adjusted EBITA) and Board Age Diversity

| Independent Variables | (a)          | (b)          | (c)          | (d)          | (e)          | (f)          | (g)          |
|-----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| AGE SEPARATION-SD     | -0.16828     | (0.62657)    | -1.13353     | (0.84728)    | 1.13353      | (0.84728)    | 1.05046      |
| AGE VARIETY – BLAU     | 7.13678      | (4.64550)    | 13.24787     | (6.41722)    | 13.78938*    | (6.33256)    | 16.17247*    |
| AGE DISPARITY-CV       | -19.19330    | (36.80411)   | -72.90095    | (48.46919)   | 5.76903      | (4.32480)    | 1.22084      |
| PAY DISPARITY-CV       | 6.09995      | (4.34088)    | 0.24584      | (0.16308)    | 0.27448      | (0.15514)    | 0.21183      |
| FIRM SIZE             | 1.30385*     | (0.77229)    | 1.34748*     | (0.73512)    | 1.23838      | (0.78566)    | 0.21183**    |
| CAPITAL               | 0.24584      | (0.08226)    | 0.27448*     | (0.08469)    | 0.24270      | (0.08793)    | -0.21113**   |
| EXPENDITURES/SALES    | 0.16038      | (0.07933)    | 0.15514*     | (0.07756)    | 0.14684      | (0.08903)    | 0.15321**    |
| LEVERAGE              | -0.21183**   | (0.08226)    | -0.21113*    | (0.08469)    | -0.15496*    | (0.08903)    | -0.15321*    |
| SALES GROWTH          | 0.22086***   | (0.07933)    | 0.21868**    | (0.07756)    | 0.21556*     | (0.08903)    | 0.21820**    |
| LIQUIDITY             | 0.08728**    | (0.07933)    | 0.08903***   | (0.07756)    | 0.08645***   | (0.08903)    | 0.21820**    |
| CONSTANT/INTERCEPT    | -0.40870     | (9.40084)    | -6.31686     | (7.87584)    | 1.35761      | (7.63722)    | 1.91112      |

| Country Dummies        | Included     | Included     | Included     | Included     | Included     | Included     | Included     |
| Industry Dummies       | Included     | Included     | Included     | Included     | Included     | Included     | Included     |
| R²                    | 0.2545       | 0.2605       | 0.2555       | 0.2455       | 0.2677       | 0.2704       | 0.2661       |
| F- test               | 7.47 ***     | 7.80 ***     | 7.35 ***     | 6.75 ***     | 7.13 ***     | 7.21 ***     | 6.25 **      |
| N. obs.               | 205          | 205          | 205          | 173          | 205          | 205          | 173          |

The table reports regression results of corporate performance using OLS estimator. Corporate performance (adjusted EBITA) is measured by the difference between a firm’s EBITA and the average EBITA across all listed firms in the same two-digit SIC and from the country in which the company is registered. AGE SEPARATION by standard deviation of the age of directors, AGE VARIETY by Blau’s Index, AGE DISPARITY by coefficient of variation of the age of directors, PAY DISPARITY by coefficient of variation of director’s pay, FIRM SIZE by natural log of total assets as an indicator for size, CAPITAL EXPENDITURES/SALES by capital expenditures divided by sales as proxy for investment ratio, LEVERAGE by total debt per unit of total assets as a proxy for capital structure, SALES GROWTH by annual growth rate of sales as indicator of growth, LIQUIDITY by current assets to current liabilities as proxy for liquidity. Robust standard errors are in brackets. \( p < 0.10 \); \( * p < 0.05 \); \( ** p < 0.01 \); \( *** p < 0.001 \).
## TABLE 4
Regression of the Relationship Between Corporate Performance (EBITA) and Board Age Diversity, Using Interquartile Range to Measure Age Separation in Panel 4. A and Teachman Index to Measure Age Variety in Panel 4. B.

| Panel 4.A. Independent Variables | Dependent Variable: Accounting Performance (EBITA) |
|---------------------------------|--------------------------------------------------|
|                                 | (a)                                              | (c)                                              | (g)                                              |
| AGE SEPARATION – Interquartile range | 0.29933* (0.13414) | 0.13383 (0.15283) | 0.17645 (0.17645) |
| AGE VARIETY – BLAU              | 0.13414   | 5.40088* (2.73651) | 6.75530* (2.72928) |
| PAY DISPARITY - CV              | 0.8341 (1.68268) | 0.8341 (1.68268) | 0.8341 (1.68268) |
| FIRM SIZE                       | 0.85439* (0.35788) | 0.82001* (0.35591) | 0.98792* (0.38921) |
| CAPITAL EXPENDITURES/SALES      | 0.01070 (0.06581) | 0.02454 (0.06150) | 0.00642 (0.07647) |
| LEVERAGE                        | -0.12691* (0.05039) | -0.12201* (0.04790) | -0.11462* (0.04926) |
| SALES GROWTH                    | 0.15378*** (0.03651) | 0.15112*** (0.03685) | 0.12174*** (0.03898) |
| LIQUIDITY                       | 0.03337*** (0.00915) | 0.03415*** (0.00897) | 0.02996*** (0.01006) |
| CONSTANT/INTERCEPT              | -3.55745 (3.83926) | -5.13123 (4.02991) | -7.42466 (4.34099) |
| Country Dummies                 | Included | Included | Included |
| Industry Dummies                | Included | Included | Included |
| R²                              | 0.2258 | 0.2414 | 0.3092 |
| F-test                          | 4.23*** | 4.69*** | 3.81*** |
| N. obs.                         | 205 | 205 | 173 |
### Panel 4.B. Independent Variables

| Dependent Variable: Accounting Performance (EBITA) |
|--------------------------------------------------|
| (b) (e) (g)                                      |
| AGE SEPARATION - SD                             |
| -0.06343 (0.33007)                              |
| -0.01321 (0.35675)                              |
| AGE VARIETY – Teachman                          |
| 5.65541* (2.20122)                              |
| 5.98972* (2.85803)                              |
| 6.89994* (2.90948)                              |
| PAY DISPARITY –CV                               |
| 0.06343 (0.33007)                                |
| 0.01321 (0.35675)                               |
| FIRM SIZE                                       |
| 0.81116* (0.34908)                              |
| 0.79738* (0.35755)                              |
| 0.95993* (0.39259)                              |
| CAPITAL EXPENDITURES/SALES                      |
| 0.02317 (0.06121)                               |
| 0.02394 (0.06114)                               |
| 0.00304 (0.07724)                               |
| LEVERAGE                                        |
| -0.12070* (0.04715)                             |
| -0.12021* (0.04739)                             |
| -0.11415* (0.04980)                             |
| SALES GROWTH                                    |
| 0.14998*** (0.03749)                            |
| 0.14995*** (0.03771)                            |
| 0.11918*** (0.03994)                            |
| LIQUIDITY                                       |
| 0.03468*** (0.00903)                            |
| 0.03460*** (0.00901)                            |
| 0.03058*** (0.01000)                            |
| CONSTANT/INTERCEPT                              |
| -4.29205 (3.94442)                              |
| -3.95539 (4.20579)                              |
| -6.36931 (4.69896)                              |
| Country Dummies                                 |
| Included                                        |
| Included                                        |
| Included                                        |
| Industry Dummies                                |
| Included                                        |
| Included                                        |
| Included                                        |
| R²                                              |
| 0.2362                                          |
| 0.2365                                          |
| 0.2990                                          |
| F- test                                         |
| 4.72***                                         |
| 4.46***                                         |
| 3.61***                                         |
| N. obs.                                         |
| 205                                             |
| 205                                             |
| 173                                             |

The table reports regression results of corporate performance using OLS estimator. Corporate performance (EBITA) is measured by earnings before interests and taxes divided by book value of total assets, AGE SEPARATION by interquartile range of the age of directors in Panel 4.A. and standard deviation of the age of directors in Panel 4.B., AGE VARIETY by Blau’s Index in Panel 4.A. and Teachman’s Index in Panel 4.B., PAY DISPARITY by coefficient of variation of director’s pay, FIRM SIZE by natural log of total assets as an indicator for size, CAPITAL EXPENDITURES/SALES by capital expenditures divided by sales as proxy for investment ratio, LEVERAGE by total debt per unit of total assets as a proxy for capital structure, SALES GROWTH by annual growth rate of sales as indicator of growth, LIQUIDITY by current assets to current liabilities as proxy for liquidity. Robust standard errors are in brackets. * p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001.
incentives that better address the monitoring difficulties that arise with joint decision-making.

These findings are robust to both proxies for accounting performance—EBIT and country- and industry-adjusted EBIT; both proxies for age diversity as separation—standard deviation of age and interquartile range; and both proxies for age diversity as variety—Blau’s Index and Teacham’s Index.

CONCLUSION AND DISCUSSION

In light of the recent corporate governance developments after the global financial crisis, which have led to changes in the composition of boards of directors to increase their effectiveness, this study explored how board age diversity affects corporate performance. Despite recent corporate governance initiatives recommending to increase board age diversity, theories predict differing effects of board diversity to corporate performance, and previous research finds inconclusive results. In response to these disappointing cumulative results, Harrison and Klein (2007) present a diversity typology, which involves differences in the meanings of diversity, maxima, and theoretical relationships with corporate performance. The first type is diversity as separation, which refers to differences in position or opinion. The second type is diversity as variety, which represents differences in kind, category, or knowledge. Finally, diversity as disparity indicates differences in power or status among members of a group.

This study develops three hypotheses built on the upper echelons perspective (Hambrick and Mason 1984) and Harrison and Klein’s (2007) diversity typology. Focusing on age diversity, which is one of the less developed demographic diversities, and using boards of directors as units of analysis, this study empirically tests the effects of each type of age diversity on corporate performance in a sample of 205 European listed firms for the year 2009.

The main result reveals that age diversity, defined as generational diversity, positively impacts corporate performance. That is, teams whose members draw from different generations in a balanced way can translate greater information richness within a unit; for instance, whereas the older group can provide experience and wisdom, the middle group carries the major positions of active responsibilities in corporations and in society, and the younger group has the energy and plans ahead for the future (Kang et al. 2007). However, this study does not find clear evidence on the impact of age diversity as separation and disparity on corporate performance.

The results have important implications for theory, business practice, and public policy. First, this study contributes to the theoretical understanding of board diversity and the consequences on corporate performance, because it integrates psychologists’ and sociologists’ theories with a management and
economic orientation. As Eisenhardt (1989) suggests, theoretical pluralism rather than one dominant theory better captures the complexity of the behavior of boards of directors. Second, it empirically explores novel measures of age diversity of the boards, which reflects different types of diversity. Third, this study also examines the impact of the three forms of diversity simultaneously with the aim to isolate, and, hence, analyze the opposite effects of different diversity types on strategic behavior and performance. Fourth, the finding suggests that corporate governance guidelines encourage board generational diversity in order to adapt different views and make more deliberated decisions, which improves corporate performance.

As in any empirical study, the findings presented are subject to some limitations that open new areas for future research. A limitation of this study is that the measures used are sensitive to the size of the board. Given that this variable presents collinearity problems in the model, it has not been included. Therefore, future studies should address this problem in order to achieve more accurate results. As in almost any economic research, the empirical findings are conditioned by sample and availability of information. Larger samples of business cycle and countries and diversity variables are clearly needed to test the robustness of the results. The results of this study might also be limited by the possible omission of the mediators. In future research, a further extension of this study will consider corporate social responsibility strategies as mediators, because there is a large number of studies in the literature that conclude that a strategic approach to stakeholder management can have positive impacts on financial performance (Berman et al. 1999; Moneva et al. 2007).

In summation, this study offers new and interesting insights on the consequence of different types of age diversity in boards of directors and encourages future research to consider integrated views and multiple dimensions of diversity in order to advance understanding of board behavior and its relationship with corporate results.

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