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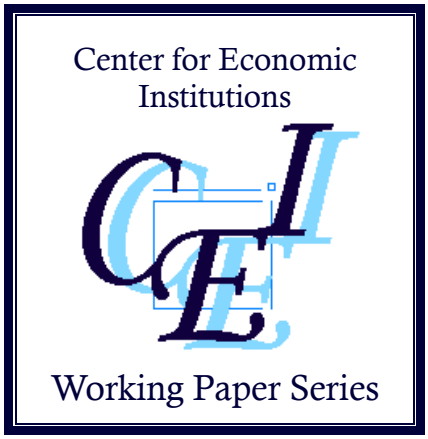

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Board Generational Diversity in Emerging Markets*

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Abstract: To identify the determinants of the generational diversity of board membership in emerging market firms, we conducted an empirical analysis using state-level social inequality indices and data on 14,598 listed/unlisted firms from 20 Eastern European countries and China. We found that, in these emerging markets, social inequality strongly inhibits the generational diversity of board membership, regardless of the gender of board members. The results also reveal that four firm attributes—board size, CEO duality, state ownership, and the presence of foreign investors from non-advanced economies as firm owners—significantly affect the age composition of board directors in line with our expectations. Two other firm attributes—ownership concentration and firm ownership by foreign investors from advanced economies—are also found to have a significant impact on board generational diversity; however, the direction of their impact contradicts our predictions. Supplementary estimations carried out by introducing various sample restrictions produce similar results, thus confirming the statistical robustness of our findings.

JEL classification numbers: D22, G32, J44, K22, L22, P34

Keywords: board generational diversity, social inequality, emerging markets, Eastern Europe, China

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1 Introduction

The globalization of the international community and the spread of the Internet have contributed to diversifying not only our economic activities but also our ideas and values. Today, we can find out about new goods and services and witness new lifestyles and ideas with hitherto unthinkable ease. Year by year, this incredible world-altering trend seems to be progressively widening the generation gap between the young, who are highly sensitive to new things and ways of thinking, and older individuals, who are averse to changes (Cole and Durham, 2007). In our society today, people are finding it increasingly more difficult to find a "common language" that enables intergenerational communications, and we are seeing fewer nationwide fads that fascinate people of all ages. These trends may be attributable to the significant generation gap of the present day.

Firms are faced with the challenge of adapting their organizations to these dramatic social changes for survival and growth. The board of directors (BOD), which sits at the top of a corporate organization, is no exception. BODs are typically dominated by men aged 50 or older. In other words, typical BODs are quite homogeneous in terms of gender and age. Although a high degree of homogeneity facilitates consensus between board directors and enables swift decision-making, it can also reduce oversight and control over management. Furthermore, homogeneous corporate boards mean that their directors can only bring limited knowledge and know-how to the boardroom, limiting the BOD's ability to adapt to the changing business environment (Carter et al., 2003; van der Walt and Ingley, 2003). The dramatically widening generation gap in recent years may have an important impact on how firms are run, which may in turn introduce significant changes to the corporate board conventionally composed of male members from the same generation. In this light, the so-called "generational diversity" of corporate boards is arguably a highly important topic to be addressed in academic research.

A study by Anderson et al. (2011) titled *The Economics of Director Heterogeneity* raises huge concerns about prior studies that focus only on the number of directors (i.e., board size) and the independence of the chairperson and other members of the board from top management (i.e., board independence); it emphasizes the importance of reviewing board composition from the perspective of human capital heterogeneity that manifests itself in the form of age, gender, ethnicity, education, professional experience, and board experience. Perhaps prompted by the concerns raised by Anderson et al. (2011), researchers of business administration and corporate finance subsequently began to focus more attention on heterogeneity among directors on corporate boards. However, despite the well-balanced questions raised by Anderson et al. (2011), an overwhelming majority

of published articles focus their attention on the gender composition of board members; consequently, only a limited amount of evidence is currently available on age and other personal attributes of board members. To our knowledge, apart from Anderson et al. (2011), only two studies have empirically analyzed the age composition of BODs. One was conducted by Kang et al. (2007) on BODs in Australia, and the other was carried out by Frye and Pham (2018) on BODs in the USA. With a marked paucity of evidence on this topic even for advanced economies, one can easily assume that no evidence might be available at all for the rest of the world.

To bridge this academic gap, our study attempts to shed light upon and identify the determinants of board generational diversity in emerging markets. Hereinafter, "emerging markets" refer to economies in China and former socialist countries in Europe. In these economies, individuals who are in their 50s when this paper is being written belong to the last generation of the era of the planned economy, who may have been strongly influenced by the totalitarian mentality and narrow mindset of the era. Inevitably, a kind of "generation gap" has arisen between this age group and individuals under 50 years of age whose personalities have been shaped amidst the highly liberal and open atmosphere of the period of the great transformation to market capitalism and democracy (Guriev and Zhuravskaya, 2009; Popova, 2014). Thus, in emerging markets, where a generation gap is widening at a speed comparable to that observed in advanced economies, firms could be suffering from the functional incompetence of BODs that is even more serious than that experienced by their counterparts in advanced economies. This predicament may be prompting some firms in emerging markets to promote board generational diversity. If this is the case, we should be able to find significant differences among emerging market firms with regard to the generational diversity of their boards; this is why we focus our attention on firms in emerging markets.

Another reason for our interest in emerging markets has to do with the widely varying social and economic conditions across these economies. In fact, they vary remarkably from each other in terms of (a) their progress in turning their economy into a market economy, (b) how democratic they have become (or how authoritarian they remain), (c) how close they are to the European Union (EU), (d) how integrated they are with the world economy, and (e) their traditions and values, all of which contribute to creating business environments that differ significantly across these countries (Iwasaki, 2020; Dallago and Casagrande, 2022). Business organizations cannot help but be influenced strongly by the social and economic condition of the country in which they operate, and the same can be said about BODs. As we believe that the age composition of board

members is influenced significantly not only by the firm-level attributes addressed by previous studies but also by the social and economic conditions of the country in which they are located, emerging markets are an excellent target for studying board generational diversity.

In view of the above issues, we will first formulate our own hypotheses regarding the factors that potentially determine the age composition of board directors. In particular, we will discuss why and how social inequality, board size, CEO duality, and ownership structure affect board generational diversity. We will then empirically examine our hypotheses by using state-level social inequality indices and data on 14,598 listed/unlisted firms from 20 Eastern European countries and China. More concretely, in addition to estimating a multivariate regression model for the entire sample that examines the impacts of social inequality, board composition, and ownership on the age structure of the whole board of directors and by gender, hypothesis testing will be conducted by comparing China and Eastern Europe; a supplementary estimation that takes into account differences in the location, firm size, and industry affiliation of sample firms will also be made.

Our results reveal that social inequality in these emerging markets strongly inhibits board generational diversity, regardless of the gender of the board members. We also found that four firm attributes—board size, CEO duality, state ownership, and the presence of foreign investors from non-advanced economies as firm owners—can cause the age composition of directors to change in a direction consistent with our expectations. Although two other firm attributes—ownership concentration and firm ownership by foreign investors from advanced economies—also have a significant impact on board generational diversity, the direction of their impact contradicts our predictions. Supplementary estimations carried out by introducing various sample restrictions yield similar results, thus confirming the statistical robustness of the above findings.

Consequently, this paper contributes to the literature by theoretically exploring and empirically analyzing the potential determinants of board generational diversity in emerging markets, which is the first attempt made in the world. This work also makes a contribution to the relevant research field by (a) examining not only firm attributes but also social factors present in the country, (b) conducting empirical analyses on a sample of directors as a whole as well as on subgroups of male and female directors, (c) analyzing not only listed companies but also unlisted firms, (d) conducting an international comparison of firms in China with those in European emerging markets in terms of board generational diversity, and (e) separately examining the effect of foreign direct investment from advanced and non-advanced economies.

The remainder of this paper is organized as follows: Section 2 presents our hypotheses regarding the various factors that may determine board generational diversity. Section 3 provides an overview of the data used for empirical analyses and describes the methodology used for hypothesis testing. Section 4 provides a real picture of board generational diversity in emerging markets. Section 5 reports our estimation results, and finally, Section 6 summarizes the main findings and concludes the paper.

2 Hypothesis Development

In this section, based on an extensive review of previous studies, we present a series of hypotheses regarding the factors that potentially determine board generational diversity in emerging market firms.

Business organizations are inevitably under the influence of the social and economic contexts in the country in which they are located. They may rather be likened to a mirror that reflects the society and economy of the country. BODs are no exception. The social common sense and ethics held by investors and managers can significantly impact the decision-making process for assigning appropriate human capital to the board. One of the most important traits they look for in selecting a board member is whether the public will look up to him/her as a person of authority. This trait, which is not just about social skills, is related to the ability to prioritize important decisions pertaining to the firm's operations and to persuade relevant individuals to comply with those decisions (Milgram, 1974).

In most countries, social inequality is often more prevalent across different generations than within a specific generation. Generations are closely linked with social classes (Hertel and Groh-Samberg, 2019). The stronger the link between them, the fewer opportunities younger generations will have to compete on equal ground with older generations. Furthermore, the stronger the intergenerational inequality, the more likely the voice of younger generations will be disregarded, thus limiting the role they play in the decision-making process. This logic also applies to the process of appointing board members. For example, boards of firms based in countries suffering from marked intergenerational social inequality are unlikely to allow younger directors to exercise their ability to the fullest, which potentially undermines their usefulness as corporate directors. Conversely, on boards that allow both younger and older generations of members to freely exchange their opinions, and in which skills are prioritized over age, younger directors can even use their youth to their advantage. One can easily imagine that, in the former example, young human capital is less likely to be appointed to the post of director, whereas, in the latter example, the young have a greater chance of holding the post. We

therefore posit the relationship between social inequality in the country in which a firm resides and the generational diversity of the board as follows:

Hypothesis 1: *Social inequality inhibits board generational diversity.*

As repeatedly documented in numerous previous studies, board size and leadership significantly impact the selection of board members (e.g., Mak and Li, 2001; Prevost et al., 2002; Iwasaki, 2008; Li and Song, 2013; Chen, 2014; Bansal and Thenmozhi, 2020). Thus, we propose the following hypothesis regarding the effect of these two factors on board generational diversity:

If a firm wishes to constitute a homogeneous pool of directors, there is no need for a large board because the marginal utility of appointing additional directors to such a board is limited at best. In other words, creating a larger board can only be effective when it is done for the purpose of ensuring board diversity (Kang et al., 2007). As pointed out by de Cabo et al. (2012), the appointment of a large number of directors to serve on the board reflects the managers' and/or owners' wish to bring together varied talents to the board so as to enhance the board's role in deciding on and monitoring actions concerning important corporate matters. We must also remember that a large BOD has another important role to play, which is to add young, inexperienced individuals as junior members to the board to not only acquire the talents necessary for the current firm's operations but also nurture them as future executive members of the firm (Baker and Gompers, 2003). Based on these arguments, we propose the following hypothesis regarding the effect of board size on board generational diversity:

Hypothesis 2a: *Larger boards promote board generational diversity.*

CEO duality can reduce a board's oversight and control over management. In line with this, authoritarian top executives tend to select directors who are sympathetic to their operating policies and requirements. Arguably, firms in which the CEO is the chairperson of the board are likely to have homogeneous pools of directors (Anderson et al., 2011). If, as Frye and Pham (2018) claim, younger directors are more inclined to monitor top management, whereas their older counterparts are more manager friendly and averse to monitoring, it then follows that firms where power is concentrated in the hands of the CEO are unlikely to appoint younger directors to the board. This notion gives rise to the following hypothesis:

Hypothesis 2b: *CEO duality inhibits board generational diversity.*

In the literature, it is also argued that, in addition to board size and leadership,

corporate ownership structure serves as an important determinant of director selection (Arthur, 2001; Prevost et al., 2002; Linck et al., 2008; Iwasaki, 2018; Lizares, 2022). Therefore, we propose our own hypothesis regarding the effects of ownership concentration and state/foreign ownership on board generational diversity as follows:

According to Kang et al. (2007), a lower ownership concentration (i.e., ownership held by more diverse shareholder/stakeholder groups) will result in greater demands by shareholders for a broadly represented board. If stronger and more effective managerial monitoring can be expected from a heterogeneous rather than a homogeneous pool of directors, it then follows that when individual shareholders have a weak voice and limited negotiating power, they try to make up for the shortcomings in corporate governance caused by ownership distribution by sending varied talents into the board as their representatives. This strengthens the board's oversight and control over management (Anderson et al., 2011). The presence of large shareholders, on the other hand, diminishes the demand for directors as monitors. This is because these big owners have sufficiently strong incentive and capacity to aggressively monitor managerial activities by themselves and have their say when necessary or because they can effectively discipline managers by facilitating third party takeovers (Shleifer and Vishny, 1986). This is why quite a few studies have found a negative relationship between ownership concentration and board independence (Pérez-Calero et al., 2019). As stressed in Iwasaki and Mizobata (2020), one of the most outstanding characteristics of firms in emerging markets is high ownership concentration, which may significantly impact the age composition of BODs. As stated above, if we assume that generational diversity of directors is one of the factors contributing to board independence, we can expect that:

Hypothesis 3a: *Ownership concentration inhibits board generational diversity.*

As compared to other shareholders, governments are more sensitive to social demands from the public. Researchers have noted that, the louder the calls for social equality from the public, the more likely it is for the government to set an example by promoting equality in the firms it owns (Mensi-Klarbach et al., 2019). Thus, when other conditions are held constant, BODs in state-owned firms are more likely to be comprised of a diverse pool of directors who vary in sociodemographic characteristics—such as race, gender, and age—relative to their counterparts in private firms. Nevertheless, the social equality pressure faced by governments in emerging markets is nothing compared to that faced by their counterparts in advanced nations. In addition, in China as well as in some of the former socialist European emerging markets, governments are often the largest

shareholders of their investee firms; therefore, they send a few high-ranking male officers from the relevant ministry or agency to serve as directors on BODs that are limited in size, thereby enjoying an enormous voice in the firms' operations (Frye and Iwasaki, 2011; Saeed et al., 2016). Taking into account both the relatively weak social equality pressure in emerging markets and the true picture of the corporate governance activities undertaken by the government to control state-owned enterprises, we predict the effect of state ownership on board generational diversity in emerging markets as follows:

Hypothesis 3b: *In emerging markets, the presence of the government as the owner of firms inhibits board generational diversity.*

Foreign investors bring not only knowledge and technology but also their corporate cultures into host countries (Long, 2006). A study of foreign direct investment in Japan by Kodama et al. (2018) demonstrates that employment policies of foreign firms place greater emphasis on gender equality relative to domestic firms; this suggests that investors from foreign countries are highly likely to introduce their business practices to the countries they enter. The presence of foreign investors as shareholders can have a similar impact on the process of appointing directors. In exercising effective corporate governance, investors from advanced nations not only place a certain value on corporate board diversity but also tend to value skills over age (Terjesen and Singh, 2008; Anderson et al., 2011). On the other hand, investors from developing nations and emerging markets prefer direct dialog and negotiation with managers and show relatively low interest in the role of BODs as a system of managerial monitoring and control. They are also subject to a strong psychological bias in favor of the experience of seniors, which stems from the traditional paternalistic culture of their motherland (Denison et al., 2004; Abe and Iwasaki, 2010). These arguments lead us to the following hypothesis regarding the effect of foreign ownership on the age composition of directors:

Hypothesis 3c: *The presence of foreign investors from advanced nations as firm owners promotes board generational diversity, whereas the presence of foreign investors from non-advanced nations inhibits board generational diversity.*

As other factors to be controlled in testing the above hypotheses, we focus on management complexity and firm performance based on the following rationale: First, oversight and control are not the only duties of BODs. Delivering their expertise and insights to top managers (i.e., advisory services) is also an important function (Iwasaki, 2008). Going public on a stock market, growing into a massive enterprise, the aging of

the workforce, the diversification of a business portfolio, and investment in risky research and development activities are some factors that can increase management complexity. The managerial challenges faced by firms with these factors are far more diverse and multi-layered as compared to those faced by operationally simpler firms. Therefore, it follows that BODs in operationally complex firms are more likely to be expected to provide adequate advisory services. Arguably, these firms may maintain more diverse BODs (Kang et al., 2007; Anderson et al., 2011).

Second, firms performing well financially may use their extra resources not only to expand their existing business and explore new business opportunities but also to actively engage in funding and investment. Such expansion of business activities cannot be successful without managerial access to additional expertise and insights.

In the following section, we empirically examine the above hypotheses by using firm-level and state-level data from 21 emerging markets.

3 Empirical Methodology

This section describes the data and empirical methodology used to test the hypotheses proposed in the previous section. Subsection 3.1 provides an overview of data, and Subsection 3.2 explains the methodology followed for our empirical analysis.

3.1 Data

To test our hypotheses, we use both firm-level and state-level data. We collected firm-level data from Orbis, a company database compiled by Bureau van Dijk. As of 2022, Orbis is the largest commercial database of firm-level records, covering over 400 million companies and organizations from various industries around the world; it provides an abundance of information on listed/unlisted companies in emerging markets. Apart from providing a business description and financial statements of each registered company, Orbis also contains information on ownership structure and board composition; this makes it an ideal source of information for our research topic.[1]

Data related to board composition disclosed by Orbis provides information on the gender and age of each director, which allowed us to identify, for each firm, the age composition of not only the BOD as a whole but also subgroups of male and female directors. Taking advantage of this feature of the Orbis database, we selected listed and unlisted companies operating in the following 21 nations, as of the first quarter of 2020,

[1] For further details about the Orbis database, see the "Orbis" page of the website run by Bureau van Dijk: https://www.bvdinfo.com/ja-jp/our-products/data/international/orbis.

for which information on the gender and age of all directors is available from the database: five Central European nations (the Czech Republic, Hungary, Poland, Slovakia, and Slovenia), five Eastern European and Baltic nations (Bulgaria, Romania, Estonia, Latvia, and Lithuania), six Southern European nations (Croatia, Serbia, Albania, Montenegro, North Macedonia, and Bosnia and Herzegovina), four former Soviet Union nations (Moldova, Belarus, Ukraine, and Russia), and China. The final sample comprises a total of 14,598 companies, of which 6,698 are listed and 7,900 are unlisted.[2] Apart from the data regarding the gender and age of each board director, we also collected data on other defining attributes of board composition as well as on ownership structure, firm size, firm age, operating industries, number of patents owned, and firm performance from Orbis, as described in detail in the next subsection.

State-level data were collected from the human development database compiled and published by the United Nations Development Programme (UNDP). The UNDP collects and summarizes various types of data to measure and compare human development indices (HDIs) and social inequality (determined on the basis of HDIs) across various countries and regions in the world. A typical example of such data is the coefficient of human inequality, which provides a measure of the inequality in human development for 189 countries and regions (including the above-mentioned 21 emerging markets). In addition to the coefficient of human inequality, we also collected indicators of educational inequality, income inequality, and overall loss in HDI due to inequality from UNDP's database. The data on these three indicators are also available for all of the 21 emerging markets.

3.2 Methodology

We estimate the following regression equation taking the generational diversity of the board in the *i*-th firm during period *t* (*generation_diversity*) as a dependent variable and social inequality in the *j*-th country in which the *i*-th firm is located during period *t-1* (*social_inequality*), the composition of the board (*board_composition*), and ownership structure (*ownership*) in the *i*-th company during period *t-1* as key independent variables for hypothesis testing. We also take management complexity (*complexity*) and firm performance (*performance*) in the *i*-th company during period *t-1* as control variables:

$$generation\_diversity_{i,t} = \mu + \beta_1 \cdot social\_inequality_{j,t-1} + \beta_2 \cdot$$

[2] Only very recently has Orbis been able to provide data on such a large number of Chinese and East European firms, especially for non-listed companies. This fact has greatly hindered the construction of a large-scale longitudinal panel data.

$$board\_composition_{i,t-1} + \beta_3 \cdot ownership_{i,t-1} + \beta_4 \cdot complexity_{i,t-1} + \beta_5 \cdot performance_{i,t-1} + \theta_k + \varepsilon_i, (1)$$

where μ is a constant term, β is the parameter to be estimated, θ is the fixed effects for the k-th industry to which the i-th firm belongs, and ε is a disturbance term.

To the left-hand side of Equation (1), we introduced the coefficient of variation (CV) of the age of directors on the board in the i-th firm during period t. The coefficient of variation is calculated separately for three director types—all directors, male directors, and female directors—as follows:

$$CV_{i,t} = \frac{age\_sd_{i,t}}{age\_mean_{i,t}}, (2)$$

where *age_mean* and *age_sd* are the mean and standard deviation of director age, respectively. Also referred to as the relative standard deviation, the coefficient of variation is a metric useful for comparing samples with different means.

Following the discussion in the previous section, the right-hand side of Equation (1) includes not only the four types of state-level variables related to social inequality mentioned in the previous subsection but also board composition variables—(a) the variable of board size measured as the number of directors on the board and (b) the dummy variable for firms with CEO duality that takes the value of 1 when the same person holds both the CEO and board chairperson positions concurrently in a firm; ownership structure variables including: (c) the variable of ownership concentration as proxied by the average shareholding ratio of shareholders/stakeholders, (d) the dummy variable for state ownership, (e) the dummy variable for firms with foreign ownership of advanced economies, and (f) that with foreign ownership of non-advanced economies; (g) the variable of management complexity that contains the first principal component of the dummy variable for listed firms, the natural log of total number of employees as proxy for firm size, the number of years in operation as proxy for firm age, the number of operating industries as proxy for business diversity, and the number of patents owned as proxy for R&D intensity; and (h) the variable of firm performance measured by the first principal component of the profit margin, the ROA volatility, and the solvency margin ratio.[3]

[3] The estimation results of the principal component analysis conducted to synthesize variables into management complexity and firm performance variables are reported in **Appendix Table A1**. The use of a principal component instead of original independent variables helps to reduce

The above 12 independent variables are all predetermined for the dependent variables, as indicated by Equation (1). Specifically, all three types of board generational diversity variables capture circumstances during the first quarter of 2020, whereas the four types of social inequality indices and the seven variables ranging from board size to management complexity capture situations during 2019, and the firm performance variable captures situations during the period from 2017 to 2019. In this way, we can avoid endogeneity arising from simultaneous causality between dependent and independent variables. We controlled for the industry-level fixed effects θ by combining a total of 13 industry dummy variables that use manufacturing industry as a reference category.[4] We estimated the regression equation by using the ordinary least squares (OLS) estimator, and we tested the statistical significance of regression coefficients by using heteroscedasticity-consistent robust standard errors.[5]

The names, definitions, and descriptive statistics of the above-mentioned variables are listed in **Table 1**.[6] **Table 2** shows the statistics representing the composition of the firm sample, age composition of BODs, and social inequality by country, with summary statistics for all 21 emerging markets given in the rightmost column. As shown in Column (a) of **Table 2**, 14,598 sample firms operate in a wide range of industrial sectors, with their sizes ranging from small to large. When compared to the actual firm population, our

overfitting and eliminate multicollinearity in multivariate regression estimation (Cheng and Iglarsh, 1976). It also greatly simplifies hypothesis testing. Because of these advantages of principal component regression, many of recent studies repeatedly employ this method (e.g., Baumöhl et al., 2019; Milovanska-Farrington, 2020; Braham et al., 2022; Liu et al., 2022). As indicated in **Appendix Table A2**, which presents the correlation matrix for the independent variables, the original firm performance variables are highly correlated with each other. In addition, we adopted numerous variables to capture the management complexity in the sample firms. Thus, we found great merit in employing the approach of principal component regression in this study. We thank a reviewer for his/her suggestion to clarify this point.

[4] For the classification of industrial sectors, we followed the "Section" level of the Statistical Classification of Economic Activities in the European Community (NACE).

[5] We performed preliminary estimations by using Tobit estimators and generalized least squares (GLS) estimators, and, as a result, confirmed that the estimation results are consistent with those from the OLS model reported in the paper.

[6] As shown in **Appendix Table A2**, the correlation coefficients of all combinations of simultaneously estimated variables fall below the threshold of 0.70 for possible multicollinearity. Furthermore, in our preliminary estimation procedure, we confirmed the variance inflation factors (VIFs) calculated for all independent variables to be less than 5.0. This was made possible by the adoption of the first principal components of the variables of management complexity and firm performance.

sample has a relatively small proportion of firms with less than 100 employees. This is mainly because these firms are less likely to have a BOD as compared to their counterparts with more than 100 employees.

4 Board Generational Diversity in Emerging Markets: A Statistical Overview

In this section, we provide a statistical overview of the generational diversity of corporate boards in emerging markets by using the dataset described in the previous section.

According to Orbis, there are a total of 135,891 director positions in the 14,598 sample firms in 21 emerging markets. As shown in Column (b) of **Table 2**, while the average age of directors in all 21 emerging markets is 50.90, it actually ranges from 48.80 in Lithuania to 55.25 in Montenegro, varying significantly across different emerging markets, which is consistent with what we predicted at the beginning of this paper. According to Brodsky (2018), the average age of directors serving on the boards of large US firms in the S&P 500 Index is 63 years as of 2017, with directors aged 50 or younger making up only 6% of all directors and 57% of all firms having no director aged 50 or younger. Thus, when compared to major US corporations, it is evident that firms operating in the 21 emerging markets seem to have BODs consisting of relatively young directors. This could be a trait characteristic of emerging markets. Furthermore, we found the average age of male directors and female directors to be 51.16 and 48.91, respectively, with a 2.25-year difference between the two groups. The average age of male directors actually varies widely across the 21 emerging markets, ranging from 48.58 in Lithuania to 58.96 in Moldova, with a 10.38-year difference between them. Similar and more marked variation can be observed in the average age of female directors across the emerging markets, which ranges from 46.40 in Belarus to 58.50 in Albania, with a 12.10-year difference between them.

According to the coefficient of variation of all directors' ages, the generational diversity of all directors ranges from 0.099 in Slovakia and the Czech Republic to 0.155 in Romania, with a difference of 0.056 between them. Similarly, the generational diversity of male directors ranges from 0.112 in China to 0.223 in Belarus, with a difference of 0.111 between them; that of female directors ranges from 0.075 in Albania to 0.161 in Montenegro, with a difference of 0.086 between them. These results show that the age composition of directors varies greatly by country and gender.

According to the social inequality indices shown in Column (c) of **Table 2**, the average inequality of human development, education, and income and the overall loss in

HDI due to inequality across the 21 emerging markets is 9.23%, 6.48%, 16.40%, and 9.41%, respectively, with a coefficient of variation of each of these indices across the 21 emerging markets being 0.325, 0.825, 0.325, and 0.329, respectively; this reveals a remarkable variation in educational inequality across these nations.

Figure 1 shows kernel density estimation results for board generational diversity variables. As shown in Panel (a) of the figure, the coefficients of variation of all directors' ages have a distributional peak of approximately 0.10 with a long tail on the right. A similar characteristic can be observed in Panels (b) and (c), which show distributions of the coefficients of variation of male and female directors, respectively. Separating sample firms into Chinese firms and European firms and comparing them in Panels (d), (e), and (f) reveals that BODs in European firms generally exhibit greater generational diversity relative to their counterparts in Chinese firms, regardless of the gender of directors. On the other hand, separating European firms into the four different regions shown in **Table 2** and comparing their distributions with each other as shown in Panels (g), (h), and (i) in **Figure 1** does not show any marked differences across firms in these regions. Thus, in terms of board generational diversity, although a certain heterogeneity can be observed between Chinese and European firms, firms in different regions of Eastern Europe are relatively homogeneous.

Table 3 lists the correlation coefficients that show how each board generational diversity variable is related to individual independent variables. Evidently, all indices of state-level social inequality are negatively correlated with each of the three board generational diversity variables at the 1% statistical significance level, which is in agreement with our assumption outlined in Hypothesis 1. On the other hand, none of the firm-level variables, ranging from board size to foreign ownership of non-advanced economies, are significantly correlated with all of the board generational diversity variables in a way that aligns with our assumptions. Furthermore, three of the variables—CEO duality, ownership concentration, and foreign ownership of advanced economies—showed statistically significant correlations with either some or all of the board generational diversity variables. This contradicts our hypotheses regarding their effects on board generational diversity. In the next section, we examine whether similar results can be reproduced in a multivariate regression analysis that simultaneously controls for these independent variables.

5 Estimation Results

Through the regression estimation of Equation (1), this section examines in a more

rigorous manner how social inequality and firm-level attributes affect board generational diversity in emerging markets. In Subsection 5.1, we report the results obtained from the estimation performed by using observations from all emerging market firms. In Subsection 5.2, we compare Chinese firms with European firms. In Subsection 5.3, we test the statistical robustness of our estimation results. Finally, in Subsection 5.4, we present our interpretations of some unexpected results.

5.1 Estimation results for all emerging market firms

Table 4 shows the estimation results for all emerging market firms. Models [1] to [12] in this table represent the results of OLS estimation that combines each of the three types of dependent variables, i.e., the board generational diversity variable, the generational diversity of male directors variable, and the generational diversity of female directors variable, with each of the four types of social inequality indices, ranging from inequality of human development to loss of human development due to inequality. A total of 12,635 firms were included in the analysis. All firm-level variables necessary for the estimation were available for these firms.

As shown in **Table 4**, in all 12 models, three of four state-level variables that serve as proxies for social inequality—inequality in human development, inequality in income, and loss in human development due to inequality—were repeatedly estimated to be negative and statistically significant at the 5% level or less. Moreover, in Model [6], which uses the generational diversity of male directors as a dependent variable, the variable of inequality of education was given a negative coefficient with statistical significance at the 1% level. These results suggest that, in countries where there is higher social inequality in terms of human development and income levels (or educational levels among the male population), firms are less likely to constitute generationally diverse boards. This agrees with Hypothesis 1, which states that the negative impact of social inequality inhibits board generational diversity.

The variables of board size and CEO duality were estimated to be positive and statistically significant in Models [1] to [8] and negative and statistically significant in Models [1] to [4]. This can be interpreted as supportive of Hypothesis 2a, which suggests the positive correlation between board size and board generational diversity when either the BODs as a whole or male directors are concerned. It also supports Hypothesis 2b, which proposes the negative relationship between CEO duality and diversity of board members based on their age when BODs as a whole are concerned. On the other hand, these two variables were estimated to be insignificant in models using the generational diversity of female directors as the dependent variable. This indicates that board

composition may not be an important factor in determining the age composition of female directors.

Models that analyze state ownership against board generational diversity and the generational diversity of male directors and models that analyze foreign ownership of non-advanced economies against board generational diversity both produced significant and negative estimates. This partially supports our expectations outlined in Hypothesis 3b and the latter half of Hypothesis 3c—that the presence of the government and foreign investors from non-advanced nations inhibits board generational diversity. On the other hand, ownership concentration was estimated to be positive and significant in Models [1] to [8], and foreign ownership of advanced economies was estimated to be negative and significant in all 12 models. Thus, contrary to our predictions, these results neither support Hypothesis 3a—regarding the negative impact of ownership concentration—nor the first half of Hypothesis 3c—regarding the positive impact of foreign ownership of advanced nations. We could also see that only foreign ownership of advanced economies statistically significantly influences the age composition of female directors.

With respect to the control variables, although the variable of management complexity was repeatedly estimated to be significant in all 12 models, all of the estimates show a negative sign. This means that, in emerging markets, the greater the management complexity of firms, the more likely it is that their BODs will be composed of directors from the same generation. Finally, the firm performance variable was estimated to be positive and significant in Models [1] to [8], which suggests that firms with sound financial performance may be more willing to constitute generationally diverse boards. However, we found that this logic may not necessarily apply to female directors, as suggested by the insignificant estimation results for this variable in Models [9] to [12].

Putting aside the strength of the empirical results supporting our hypotheses, the OLS estimation results derived from Models [1] to [12] as summarized above imply that, while the age composition of either the board as a whole or male members of the board is strongly affected by most of the firm-level attributes represented by the eight independent variables from board size to firm performance, only a few of these variables affect the age composition of female board members. This gives rise to a concern that these estimation results could be affected by the bias that exists between the firms that appoint female directors and those that do not appoint any female directors at all. According to Iwasaki et al. (2022b), although the gender composition of BODs in emerging markets is comparable to that observed in advanced nations, quite a few firms in emerging market still have no female members serving on their boards. In fact, of our 14,598 sample firms,

5,355 (36.7%) do not have any female directors on their boards. The results presented for Models [9] to [12] in **Table 4** are derived from only those firms that have female directors on their BODs. These results do not, therefore, take into the account the presence of firms with no female directors, which account for nearly one-third of all sample firms. We cannot rule out the possibility that this issue poses a problem for our empirical analysis.

To examine the possible effects of the so-called "sample selection bias," we used Heckman's two-stage model, the first stage of which is a selection model that uses the probability of appointing female directors as the dependent variable and the second stage of which is an outcome model that determines the generational diversity of female directors. Results are reported under Model [13] in **Table 4**. As shown in this table, only three variables—inequality of human development, foreign ownership of advanced economies, and management complexity—are given statistically significant estimates in this model, and their regression coefficients are almost identical to those produced by Model [9]. In addition, the estimates of the inverse Mills ratio, a term used to correct for sample selection bias, are statistically insignificant. This result implies that the estimation of the generational diversity of female directors may not necessarily require the correction of a skewed distribution that could arise from the presence of two different types of firms, i.e., those that appoint female directors and those that do not. We can, therefore, reasonably assume that the estimation results from Models [9] to [12], which use generational diversity of female directors as a dependent variable, can be compared with the results from Models [1] to [4] and Models [5] to [8], which determine the generational diversity of the board as a whole and that of the male members of the board, respectively.

5.2 Comparison of Chinese firms with European firms

As described in the previous section, there is a marked difference between Chinese and European firms in terms of the age composition of board directors. Furthermore, there is significant heterogeneity between Chinese and European emerging markets in terms of their socioeconomic systems, the progress they have made in transitioning from the planned system to a market economy, the social standing of women, and their legal systems (Iwasaki et al., 2020; 2022a). We cannot deny the possibility that these differences between China and Eastern Europe have exerted a certain impact on the estimation results reported in **Table 4**. To address this issue, we carried out a separate estimation for Chinese and European firms in order to examine the statistical robustness of the firm-level variables. **Table 5** shows the results. In Models [2], [4], and [6], which use observations of European firms, we controlled for country-level fixed effects, which were used as a substitute for social inequality variables, to enable comparison with

Models [1], [3], and [5] with observations of Chinese firms.

As shown in **Table 5**, no large differences were observed between Chinese and European firms in terms of the effects of firm-level attributes on board generational diversity, although the age distribution of board members and domestic circumstances differ considerably between the two. In particular, the signs of all independent variables estimated to be statistically significant were found to be consistent between Chinese firm models and European firm models, and the estimation results were in agreement with those reported in **Table 4**. This attenuates the concern that the use of a sample that combines firms from China and European emerging markets could have contributed to producing the empirical results that contradict our expectations. We can, therefore, conclude that the estimation results reported in **Table 4** are statistically robust to this sample restriction.

We must, however, pay attention to the fact that the statistical significance of the effects of each firm-level attribute on board generational diversity does differ between Chinese and European firms. In particular, we note that (a) CEO duality exerts a negative effect on the generational diversity of male directors in Chinese firms; (b) state ownership has a significant effect on the generational diversity of male directors in Chinese firms but not on that in European firms; (c) ownership by foreign investors from advanced economies exerts no effect on the age composition of female directors in Chinese firms; (d) ownership by foreign investors from non-advanced economies has an effect on only European firm. Another outstanding aspect of the estimation results in **Table 5** is that when observations for Chinese firms and those for European firms were examined separately, the statistical significance of ownership concentration decreased substantially.

5.3 Statistical robustness of estimation results

We carried out estimations by introducing various sample constraints aimed at addressing how differences among sample firms with respect to the countries in which they operate, their sizes, and the industrial sectors to which they belong could affect our findings, in an attempt to examine the statistical robustness of our estimation results.

First, because Chinese firms account for 49.9% of the entire sample, their presence could have had a considerable impact on the estimation results. To address this problem, we carried out estimations by removing all observations of Chinese firms. To this end, we used the variable inequality of human development consistently in this regression supplement because it is the most comprehensive index of social inequality. **Table 6** reports the results. As indicated in Models [1], [6], and [11] in the table, all estimates of the inequality of human development are identical to those given by the corresponding

models in **Table 4**.

Second, considering the possibility that the extent to which social inequality and firm-level attributes impact managerial decisions concerning the composition of BODs can vary between small-to-medium-sized and large firms, we divided the sample firms into two groups and referred to the median of the firm size variable to carry out additional estimations. The results are summarized in Models [2], [7], and [12] for the larger firm group and Models [3], [8], and [13] for the smaller firm group in **Table 6**. The comparison of estimates produced for these two groups reveals no marked difference.[7]

As stated above and as described in **Table 2**, our sample firms operate in a wide range of industrial sectors. From this viewpoint, we carried out a third robustness check to confirm whether the empirical results shown in **Table 4** can be reproduced even when we limit the target of our analysis to a specific industrial sector. The estimation results reported in Models [4], [9], and [14] and Models [5], [10], and [15] are based on observations from mining and manufacturing firms and service firms, respectively. Even in these six models, the estimates of inequality of human development turned out to be negative and significant, and many of the firm attributes were also estimated to be significant, with the signs of their estimates being in agreement with those of the estimates reported under Models [1], [5], and [9] in **Table 4**.[8]

Summing up, the supplementary estimation results reported in **Table 6** imply that board generational diversity in emerging markets is consistently related to social inequality and a series of firm-level attributes, even when heterogeneity across sample firms in terms of the countries in which they are located, their company sizes, and the industrial sectors to which they belong are controlled for.[9] We can, therefore, conclude that the empirical results reported in Subsection 5.1 are statistically robust.

5.4 Discussion

[7] We also used the 25th, 50th, and 75th percentiles of the firm size variable to split the sample into four groups, and we confirmed that there were no marked differences between the resulting estimates for each group and the estimates produced by the models reported in **Table 6**.

[8] The models in which the target of estimation is limited to firms in the agriculture, forestry, and fisheries industry or the construction industry also produce similar analysis results, although these results are not reported here due to space limitations.

[9] Although **Table 6** reports only the results of estimations performed using the inequality of human development variable, similar robustness checks performed by using three other social inequality variables also yielded estimation results that are in agreement with those reported in **Table 4**.

Last, we present our views on why the empirical results on the effects of ownership concentration and firm ownership by foreign investors from advanced economies on the age composition of directors contradict our hypotheses. In addition, we also discuss the reason for the negative impact of management complexity on board generational diversity, which also contradicts the standard theory, thus raising a unique question regarding emerging market firms.

According to Whidbee (1997), in countries where the corporate control market is underdeveloped or where shareholders must, for whatever reason, incur substantial costs to sell all of their shares, large shareholders could use their bargaining power to reinforce the monitoring function of the board in order to increase their ability to collect managerial information or strengthen their authority to dismiss managers who fail to increase corporate values. In fact, a significant amount of the empirical evidence supporting the hypothesis proposed by Whidbee (1997) has been provided by studies dealing with Japan, which is known for its weak capital market discipline, and others dealing with developing nations and unlisted firms (Mak and Li, 2001; Roosenboom, 2005). Iwasaki (2016) also confirms that the ownership share of major shareholders is positively correlated with board independence in Russia, one of the countries of interest in this study. Similar trends can be observed in other emerging markets, where ownership concentration and the generational diversity of BODs seem to complement rather than substitute for one another.

Further, our results indicate that not only foreign investors from developing nations or emerging markets but also those from advanced economies are averse to having diverse ages represented on the boards of the firms they invest in. One reason for this could be that investors from advanced economies share the same understanding as those from third world countries, where there is an inherent distrust of formal corporate governance mechanisms in China and Eastern Europe; thus, greater importance is placed on using the boardroom for direct dialog and negotiations with managers rather than on strengthening the oversight and control function of BODs by advocating for board diversity. Filatotchev et al. (1999), Puffer and McCarthy (2011), and many other researchers have repeatedly observed a strong tendency for managerial entrenchment and opportunistic behavior of corporate executives in emerging markets. The presence of this type of manager is particularly troublesome for foreign investors who are faced with cultural and language barriers; to properly discipline such managers, foreign investors may have little choice but to directly monitor and negotiate with them by themselves. Even foreign investors from advanced economies may feel that the appointment of directors from a more diverse age range does not align with their goal of imposing direct discipline on managers.

Finally, as for the effect of management complexity on the age composition of BODs, we individually estimated five proxy variables for management complexity, which are listed in **Table 1**—listed firm, firm size, firm age, business diversification, and R&D intensity—in an attempt to find out which of the specific factors associated with management complexity exert particularly strong negative effects on board diversity. According to the results reported in **Appendix Table A3**, firm size was estimated to be negative and significant in Models [1] and [2], which use observations of all firms and those of Chinese firms. Firm size and R&D intensity were estimated to be negative and significant in Model [3], which targets European firms. On the other hand, firm age was estimated to be positive and significant in models that use observations of all firms and Chinese firms; listed firm was estimated to be positive and significant in the model that targets Chinese firms.

The above findings suggest that, when other conditions are held constant, larger firms in emerging markets are generally more likely to have boards with less age diversity regardless of the country or region in which they are located. One possible explanation for this phenomenon may be closely related to the fact that many large and mid-sized firms in communist China and formerly socialist economies in Europe are either state-owned or formerly state-owned privatized firms, where part of their stock is held by the government. As Saeed et al. (2016) pointed out, these state-owned enterprises are under the strong influence of the corporate culture fostered during the era of the planned economy, which makes the firms' internal organizations extremely bureaucratic and hierarchical. Furthermore, most of these firms appoint older male managers and, due to political considerations, form boards composed of many politicians, high-ranking officers from government ministries, and current or former managers of other state-owned or privatized firms (Hoffman, 2002; Frye and Iwasaki, 2011). This results in BODs dominated by male members who come from the same generation as managers of the firms. We cannot discard the possibility that some empirical results reported in this paper reflect circumstances peculiar to China and former socialist countries in Europe.

As stated above, we can provide some reasons as to why some of our hypotheses have been empirically rejected. What confuses us most about our results is that almost none of the firm-level attributes are found to be systematically related to the age composition of female directors. In the absence of evidence providing theoretical considerations or empirical findings about this issue in particular, we have no way of properly answering this question at this moment. Further research will hopefully fill in this gap.

6 Conclusions

In this paper, we conducted an empirical analysis using state-level social inequality indices and data on 14,598 listed/unlisted firms from 20 Eastern European countries and China to identify the determinants of board generational diversity in emerging market firms. Our results reveal that social inequality in the emerging markets strongly inhibits the generational diversity of board membership, regardless of the gender of board members. We also find that four firm attributes—board size, CEO duality, state ownership, and the presence of foreign investors from non-advanced economies as firm owners—can cause the age composition of boards to change in a direction consistent with our predictions.

Although two other firm attributes—ownership concentration and firm ownership by foreign investors from advanced economies—are also found to have a strong impact on board generational diversity, the direction of their impact contradicts our expectations. We also find that factors that affect the generational diversity of female directors are limited as compared to those that affect the generational diversity of the board as a whole or male members of the board. These empirical results are reproduced in supplementary estimations carried out by introducing various sample restrictions, thus confirming their statistical robustness.

As mentioned in Section 4, our results suggest that boards of directors of emerging market firms are likely to be composed of younger individuals than those of firms in developed countries. This finding is a quite interesting, given that social inequality is stronger in China and Eastern Europe than in Western countries and, therefore, the negative effect of this factor on board generational diversity in the emerging market countries is larger. If Chinese and Eastern European governments develop policies that contribute to reducing social inequality, generational diversity on boards of directors may deepen, leading to more daring and innovative firms. Furthermore, our results reveal that the presence of foreign investors from developed economies as corporate owners in emerging market countries does not necessarily promote generational diversity on boards of directors. This may be due to foreign investors' distrust of emerging market firms and citizens' intolerance of foreign cultures and business ethics in emerging market countries. Resolving these problems and building a more trustworthy and internationally open business community should be important policy issues for governments in emerging market countries.

As described above, this study contributes to the literature by being the first attempt in the world to shed light on the generational diversity of boards in business companies operating in Chinese and European emerging markets as well as by identifying the determinants of board generational diversity in these countries. In addition, the hypotheses we propose in Section 2 can be generalized to advanced and developing nations, thus ensuring the comparability of data between emerging markets and other nations/regions of the world. As stated earlier in this paper, studies of the generational diversity of BODs are still in their infancy. We hope that our study will provide the impetus to promote further research in this field.

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Table 1. Names, definitions, and descriptive statistics of variables used in empirical analysis

Variable name	Definition	Descriptive statistics		
		Mean	Median	S.D.
Dependent variables[a]				
Board generational diversity	Coefficient of variation of age of board directors	0.12	0.11	0.07
Generational diversity of male directors	Coefficient of variation of age of male directors	0.13	0.11	0.08
Generational diversity of female directors	Coefficient of variation of age of female directors	0.13	0.12	0.09
Independent variables[b]				
Inequality of human development	Arithmetic mean of the values of inequality of life expectancy, inequality of education, and inequality of income	12.39	14.20	3.66
Inequality of education	Inequality of distribution of years of schooling based on data from household surveys estimated using the Atkinson inequality index (%)	8.87	11.70	4.94
Inequality of income	Inequality of income distribution based on data from household surveys estimated using the Atkinson inequality index (%)	22.49	24.00	5.82
Loss of human development due to inequality	Percentage difference between the value of coefficient of human inequality and the value of human development index (%)	12.65	14.50	3.74
Board size	Total number of board directors	9.05	6.00	9.29
CEO duality	Dummy for companies in which CEO holds a position of board chairperson concurrently	0.39	0.00	0.49
Ownership concentration	Average ownership share per shareholder/member	0.40	0.25	0.36
State ownership	Dummy for state-owned enterprises	0.07	0	0.25
Foreign ownership of advanced economies	Dummy for firms with a foreign owner(s) from advanced economies	0.17	0	0.37
Foreign ownership of non-advanced economies	Dummy for firms with a foreign owner(s) from developing/emerging economies	0.04	0	0.19
Listed firm	Dummy for listed companies	0.46	0	0.50
Firm size	Log of total number of employees	5.97	5.65	1.57
Firm age	Years in operation	23.68	20	18.09
Business diversification	Number of operating industries according to the NACE Rev 2 secondary codes	1.90	0	4.30
R&D intensity	Log of total number of patents	46.36	0.00	826.81
Management complexity	First principal component score of the variables of being listed, firm size, firm age, business diversification, and R&D intensity[c]	0.00	-0.07	1.27
Profitability	3-year average of profit margins	7.73	6.08	12.96
Financial risk	3-year standard deviation of ROA	4.95	2.32	82.34
Solvency	3-year average of solvency ratio	51.07	53.34	25.14
Firm performance	First principal component score of the variables of profitability, financial risk, and solvency[c]	0.00	0.07	1.15

Notes: **Appendix Table A2** shows a correlation matrix of independent variables.

[a] Takes a value in the first quarter of 2020

[b] Observation period of the variables of profitability, financial risk, and solvency is 2017–19, while that of other variables is 2019.

[c] **Appendix Table A1** shows estimation results of principal component analysis.

Source: Country-level variables from inequality of human development to loss in human development due to inequality are obtained from the UNDP human development database (http://hdr.undp.org/en). Firm-level variables are based on ORBIS database.

Table 2. Composition of sample firms, age structure of board directors, and social inequality by country and in all 21 emerging markets

	Central Europe					Eastern Europe and Baltics					Southern Europe						Former Soviet Union				Asia	All 21 emerging markets
	Czech Republic	Hungary	Poland	Slovakia	Slovenia	Bulgaria	Romania	Estonia	Latvia	Lithuania	Croatia	Serbia	Albania	Montenegro	North Macedonia	Bosnia-Herzegovina	Moldova	Belarus	Ukraine	Russia	China	
(a) Composition of sample firms																						
Total number	289	790	750	207	120	828	783	725	238	53	372	757	18	83	25	42	19	2	81	1,135	7,281	14,598
Listed companies	7	13	136	16	10	69	183	15	9	16	69	161	0	35	21	18	15	0	43	179	5,683	6,698
Unlisted companies	282	777	614	191	110	759	600	710	229	37	303	596	18	48	4	24	4	2	38	956	1,598	7,900
Agriculture, forestry, and fisheries	2	53	4	3	0	34	27	13	3	1	13	33	0	0	0	0	1	0	1	79	107	374
Mining and manufacturing	149	346	344	122	57	334	407	327	79	21	156	389	0	25	13	16	8	0	52	565	4,959	8,369
Construction	10	37	37	8	0	67	63	38	14	5	21	68	2	6	0	3	0	0	2	56	104	541
Services	128	354	365	74	63	393	286	347	142	26	182	267	16	52	12	23	10	2	26	435	2,111	5,314
Companies with less than 100 employees	55	269	186	57	23	324	233	368	95	9	92	264	1	29	3	6	3	1	3	266	757	3,044
Companies with from 100 to 499 employees	160	392	350	105	60	376	398	305	114	26	196	362	10	44	16	26	10	0	18	480	2,512	5,960
Companies with from 500 to 999 employees	45	62	87	23	20	71	78	34	19	6	45	60	4	7	3	4	3	1	17	149	1,013	1,751
Companies with 1000 or more employees	29	67	127	22	17	57	74	18	10	12	39	71	3	3	3	6	3	0	43	240	2,999	3,843
(b) Age structure of board directors[a]																						
Average age of all directors	51.87	50.32	51.59	52.83	52.19	51.61	52.38	50.83	50.88	48.80	54.78	53.77	54.61	55.25	52.38	53.08	52.47	50.10	53.06	51.32	49.90	50.90
S.D. of age of all directors	5.165	7.593	5.206	5.192	5.245	7.516	8.063	7.631	5.506	5.051	6.274	7.800	7.261	7.133	6.580	6.710	6.074	5.450	6.220	6.041	5.182	5.985
Coefficient of variation of age of all directors	0.099	0.151	0.101	0.099	0.100	0.146	0.155	0.150	0.108	0.105	0.115	0.146	0.132	0.130	0.122	0.126	0.117	0.107	0.119	0.118	0.105	0.118
Average age of male directors	52.38	50.07	51.99	53.63	52.42	51.36	52.46	50.53	51.06	48.58	54.73	52.60	55.09	54.03	52.37	52.38	58.96	53.70	53.14	51.17	50.64	51.16
S.D. of age of male directors	6.673	8.273	6.574	6.634	6.799	8.164	8.429	7.993	6.947	6.413	7.223	8.180	8.580	7.571	7.171	7.138	7.817	12.000	7.628	7.409	5.638	6.453
Coefficient of variation of age of male directors	0.128	0.165	0.127	0.125	0.128	0.159	0.162	0.158	0.136	0.135	0.133	0.156	0.154	0.139	0.131	0.133	0.147	0.223	0.146	0.144	0.112	0.127
Average age of female directors	49.15	48.41	49.30	50.13	50.92	48.37	50.73	48.90	48.00	47.60	53.64	51.10	58.50	52.89	50.63	53.23	52.00	46.40	51.32	48.73	48.04	48.91
S.D. of age of female directors	5.767	7.493	6.048	4.950	6.450	6.839	7.338	7.547	4.727	5.350	6.965	7.355	4.650	8.500	5.925	6.633	5.100	4.500	6.162	7.083	5.749	6.435
Coefficient of variation of age of female directors	0.109	0.156	0.126	0.105	0.125	0.140	0.148	0.154	0.097	0.111	0.129	0.146	0.075	0.161	0.101	0.131	0.110	0.097	0.125	0.140	0.121	0.132
(c) Social inequality[b]																						
Inequality of human development	4.40	7.30	7.60	6.10	4.60	11.30	11.40	6.90	9.20	10.00	7.90	12.10	10.90	9.40	11.80	14.20	10.30	6.30	6.50	10.00	15.70	9.23
Inequality of education	1.40	3.10	4.90	1.60	2.10	6.10	5.30	2.30	2.50	3.90	4.70	22.10	12.30	7.80	8.40	17.00	7.30	3.70	3.60	4.20	11.70	6.48
Inequality of income	8.90	14.50	13.50	11.70	8.70	21.80	22.70	14.80	19.60	20.60	14.70	24.00	13.20	16.90	19.20	20.20	14.00	10.80	8.50	18.80	27.40	16.40
Loss of human development due to inequality	4.40	7.40	7.60	6.20	4.60	11.60	11.80	7.10	9.60	10.30	8.00	12.50	10.90	9.70	12.00	14.50	10.40	6.30	6.50	10.20	16.00	9.41

Notes: See Table 1 for definitions and descriptive statistics of social inequality variables.

[a] Sample company average

[b] The value for all emerging markets is a simple average of 21 countries.

Figure 1. Kernel density estimation of the age of board directors

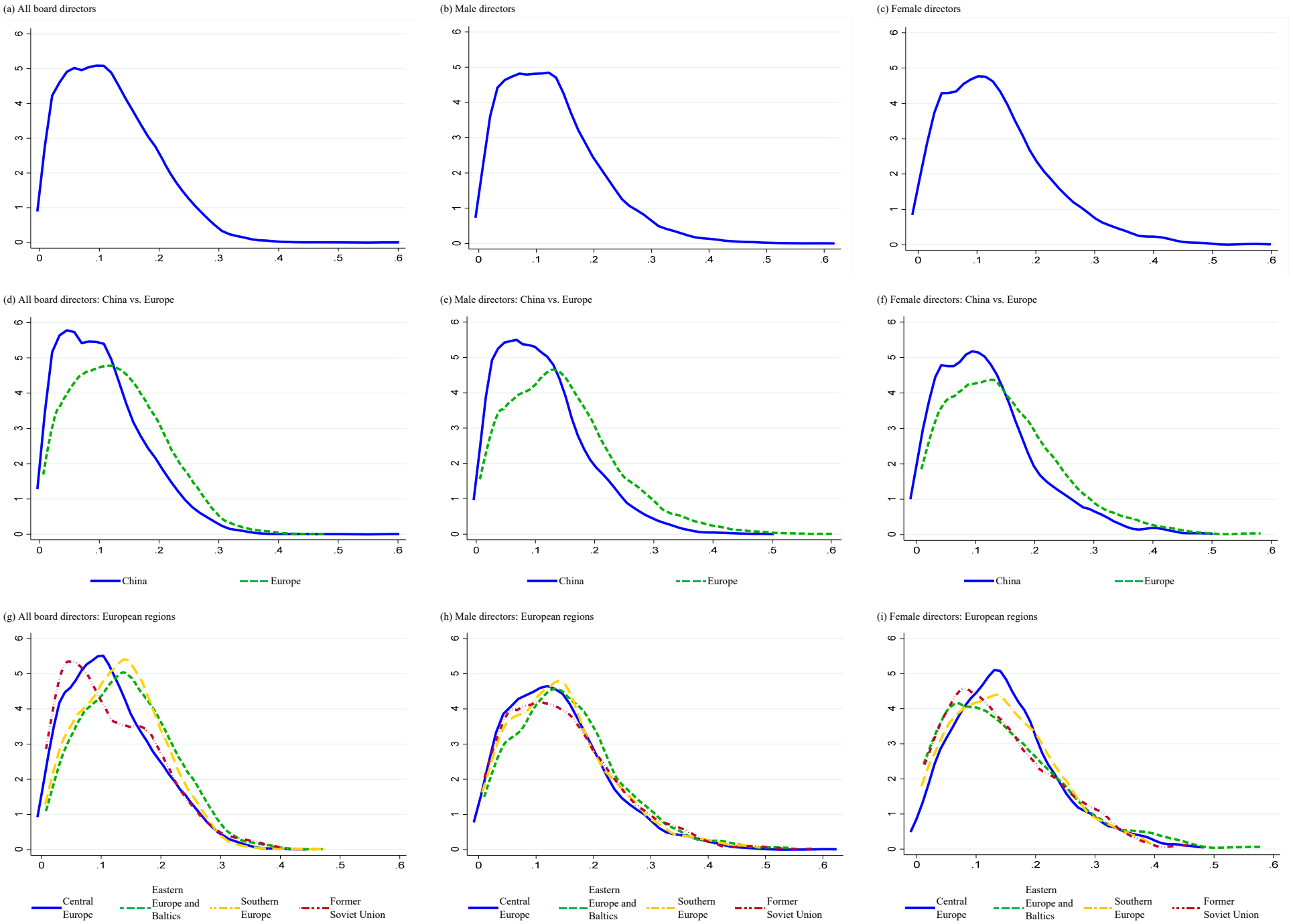

Table 3. Correlation coefficients between the variables of board generation diversity and independent variables

	Board generational diversity	Generational diversity of male directors	Generational diversity of female directors
Inequality of human development	-0.123 ***	-0.167 ***	-0.126 ***
Inequality of education	-0.058 ***	-0.121 ***	-0.060 **
Inequality of income	-0.092 ***	-0.148 ***	-0.111 ***
Loss of human development due to inequality	-0.120 ***	-0.165 ***	-0.124 ***
Board size	0.102 ***	0.069 ***	-0.036
CEO duality	0.013	0.058 ***	0.097 ***
Ownership concentration	0.065 ***	0.103 ***	0.087 ***
State ownership	0.011	-0.019 *	-0.017
Foreign ownership of advanced economies	-0.035 ***	0.023 **	-0.037
Foreign ownership of non-advanced economies	-0.002	0.033 ***	0.011

Notes: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Table 1 provides definitions and descriptive statistics of the variables.

Table 4. Estimation results of all sample firms

Dependent variable	Board generational diversity				Generational diversity of male directors				Generational diversity of female directors				
Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
Social inequality													
Inequality of human development	-0.00178 ***				-0.00291 ***				-0.00282 **				-0.00290 ***
	(0.0003)				(0.0004)				(0.0011)				(0.0010)
Inequality of education		-0.00003				-0.00083 ***				-0.00035			
		(0.0002)				(0.0003)				(0.0005)			
Inequality of income			-0.00038 **				-0.00127 ***				-0.00138 **		
			(0.0002)				(0.0002)				(0.0007)		
Loss of human development due to inequality				-0.00159 ***				-0.00274 ***				-0.00268 **	
				(0.0003)				(0.0004)				(0.0011)	
Board composition													
Board size	0.00124 ***	0.00133 ***	0.00130 ***	0.00124 ***	0.00096 ***	0.00104 ***	0.00100 ***	0.00096 ***	0.00011	0.00016	0.00011	0.00011	0.00016
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0003)
CEO duality	-0.00450 ***	-0.00350 **	-0.00379 **	-0.00441 ***	-0.00062	0.00070	-0.00004	-0.00057	0.00829	0.00929	0.00893	0.00836	0.00822
	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0071)	(0.0071)	(0.0070)	(0.0071)	(0.0067)
Ownership structure													
Ownership concentration	0.00698 ***	0.01018 ***	0.00918 ***	0.00729 ***	0.00850 **	0.01380 ***	0.01068 ***	0.00880 **	0.00529	0.01155	0.00731	0.00556	0.00362
	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0093)	(0.0093)	(0.0093)	(0.0093)	(0.0093)
State ownership	-0.00740 ***	-0.00776 ***	-0.00754 ***	-0.00739 ***	-0.01215 ***	-0.01157 ***	-0.01185 ***	-0.01209 ***	-0.00774	-0.00583	-0.00660	-0.00757	-0.00827
	(0.0026)	(0.0026)	(0.0026)	(0.0026)	(0.0036)	(0.0037)	(0.0036)	(0.0036)	(0.0077)	(0.0077)	(0.0077)	(0.0077)	(0.0089)
Foreign ownership of advanced economies	-0.01853 ***	-0.01461 ***	-0.01597 ***	-0.01819 ***	-0.01552 ***	-0.01043 ***	-0.01374 ***	-0.01527 ***	-0.02758 ***	-0.02403 ***	-0.02640 ***	-0.02738 ***	-0.02787 ***
	(0.0020)	(0.0019)	(0.0020)	(0.0020)	(0.0030)	(0.0029)	(0.0030)	(0.0030)	(0.0073)	(0.0070)	(0.0072)	(0.0073)	(0.0071)
Foreign ownership of non-advanced economies	-0.01287 ***	-0.01078 ***	-0.01150 ***	-0.01265 ***	-0.00016	0.00297	0.00078	0.00003	-0.01741	-0.01456	-0.01628	-0.01717	-0.01725
	(0.0034)	(0.0034)	(0.0034)	(0.0034)	(0.0052)	(0.0053)	(0.0053)	(0.0052)	(0.0133)	(0.0132)	(0.0133)	(0.0133)	(0.0133)
Control variables													
Management complexity	-0.00767 ***	-0.01011 ***	-0.00937 ***	-0.00790 ***	-0.00651 ***	-0.00900 ***	-0.00781 ***	-0.00667 ***	-0.00485 *	-0.00800 ***	-0.00568 **	-0.00493 *	-0.00503 *
	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0029)	(0.0027)	(0.0029)	(0.0029)	(0.0030)
Firm performance	0.00169 ***	0.00145 **	0.00152 ***	0.00166 ***	0.00203 **	0.00166 **	0.00184 **	0.00200 **	0.00102	0.00072	0.00092	0.00101	0.00099
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0021)
Inverse Mills ratio	-	-	-	-	-	-	-	-	-	-	-	-	0.00174
													(0.0072)
Intercept	0.13661 ***	0.11165 ***	0.12096 ***	0.13438 ***	0.16021 ***	0.12693 ***	0.15087 ***	0.15849 ***	0.17392 ***	0.13797 ***	0.16889 ***	0.17280 ***	0.17306 ***
	(0.0042)	(0.0023)	(0.0045)	(0.0042)	(0.0060)	(0.0036)	(0.0064)	(0.0060)	(0.0169)	(0.0081)	(0.0183)	(0.0169)	(0.0183)
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12,635	12,635	12,635	12,635	8,262	8,262	8,262	8,262	1,593	1,593	1,593	1,593	6,241
R^2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	-
F/Wald test	36.39 ***	34.41 ***	34.61 ***	36.07 ***	22.65 ***	20.31 ***	21.26 ***	22.45 ***	3.13 ***	3.01 ***	3.07 ***	3.12 ***	69.34 ***

Notes: Models [1] through [12] are OLS estimations. Model [13] shows the estimation results of the Heckman two-step selection model where the first stage estimation uses the probability of appointing a female director(s) as the dependent variable. The first stage estimation includes the proportion of outsider/independent directors on the right-hand side in addition to the independent variables employed in the second-stage estimation. The number of observations in the second-stage estimation is 1587. Standard errors are computed using the Huber–White sandwich estimator and are reported in parentheses beneath the corresponding coefficients. The F/Wald test examines the null hypothesis that all regression coefficients are zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Table 1 provides detailed definitions and descriptive statistics of the variables used in the estimation.

Table 5. Comparison between Chinese and European companies

Dependent variable	Board generational diversity		Generational diversity of male directors		Generational diversity of female directors	
Sample firm	Chinese firms	European firms	Chinese firms	European firms	Chinese firms	European firms
Model	[1]	[2]	[3]	[4]	[5]	[6]
Board composition						
Board size	0.00147 ***	0.00086 ***	0.00122 ***	0.00038 ***	0.00013	0.00025
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
CEO duality	-0.01904 ***	-0.00599 **	-0.01211 ***	-0.00246	-0.01460	0.00903
	(0.0024)	(0.0024)	(0.0032)	(0.0041)	(0.0123)	(0.0103)
Ownership structure						
Ownership concentration	-0.00076	0.00303	0.00436	0.00428	-0.02105	0.00827
	(0.0044)	(0.0030)	(0.0060)	(0.0050)	(0.0167)	(0.0116)
State ownership	-0.03359 ***	-0.00619 *	-0.03419 ***	0.00795	-0.01101	-0.01510
	(0.0029)	(0.0037)	(0.0036)	(0.0064)	(0.0119)	(0.0105)
Foreign ownership of advanced economies	-0.02624 ***	-0.01596 ***	-0.02342 ***	-0.01377 ***	-0.01722	-0.03026 ***
	(0.0053)	(0.0022)	(0.0067)	(0.0035)	(0.0215)	(0.0083)
Foreign ownership of non-advanced economies	-0.00177	-0.01548 ***	0.00352	-0.00459	-	-0.02484 *
	(0.0088)	(0.0037)	(0.0112)	(0.0060)		(0.0139)
Control variables						
Management complexity	-0.00401 ***	-0.00264 *	-0.00381 **	-0.00213	-0.00746 *	-0.00450
	(0.0012)	(0.0014)	(0.0015)	(0.0022)	(0.0043)	(0.0047)
Firm performance	0.00350 ***	0.00064	0.00367 ***	0.00120	0.00396	-0.00107
	(0.0008)	(0.0008)	(0.0011)	(0.0013)	(0.0029)	(0.0030)
Intercept	0.10403 ***	0.11415 ***	0.11037 ***	0.13823 ***	0.13611 ***	0.14269 ***
	(0.0022)	(0.0038)	(0.0029)	(0.0063)	(0.0081)	(0.0144)
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-level fixed effects	No	Yes	No	Yes	No	Yes
N	6,187	6,448	4,678	3,584	824	769
R^2	0.06	0.10	0.05	0.04	0.04	0.05
F test	30.82 ***	18.11 ***	18.66 ***	5.18 ***	2.02 ***	1.76 **

Notes: The F test examines the null hypothesis that all regression coefficients are zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Table 1 provides detailed definitions and descriptive statistics of the variables used in estimations.

Table 6. Supplement estimation for robustness check

Dependent variable	Board generational diversity					Generational diversity of male directors					Generational diversity of female directors				
Sample firm	European firms	Larger firms	Smaller firms	Mining and manufacturing	Services	European firms	Larger firms	Smaller firms	Mining and manufacturing	Services	European firms	Larger firms	Smaller firms	Mining and manufacturing	Services
Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
Inequality of human development	-0.00323 ***	-0.00192 ***	-0.00195 ***	-0.00219 ***	-0.00116 ***	-0.00221 ***	-0.00318 ***	-0.00241 ***	-0.00295 ***	-0.00271 ***	-0.00002	-0.00152	-0.00515 **	-0.00209	-0.00282 *
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0007)	(0.0005)	(0.0006)	(0.0005)	(0.0006)	(0.0019)	(0.0012)	(0.0023)	(0.0017)	(0.0015)
Board composition															
Board size	0.00082 ***	0.00121 ***	0.00178 ***	0.00137 ***	0.00109 ***	0.00044 ***	0.00091 ***	0.00118 ***	0.00111 ***	0.00081 ***	0.00019	0.00018	-0.00004	0.00013	0.00013
	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0003)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0005)	(0.0002)	(0.0002)
CEO duality	-0.00301	-0.00530 **	-0.00117	-0.00680 ***	-0.00450 *	-0.00074	-0.00280	0.00302	-0.00075	-0.00268	0.01012	0.00010	0.02256	0.01219	0.00445
	(0.0022)	(0.0022)	(0.0024)	(0.0022)	(0.0026)	(0.0037)	(0.0030)	(0.0043)	(0.0031)	(0.0040)	(0.0094)	(0.0082)	(0.0139)	(0.0097)	(0.0112)
Ownership structure															
Ownership concentration	0.00526 *	0.01204 ***	0.00315	0.00578 *	0.01059 ***	0.00408	0.01530 ***	0.00015	0.00658	0.00953	0.00805	0.00448	0.00786	0.00687	0.00869
	(0.0030)	(0.0039)	(0.0033)	(0.0035)	(0.0039)	(0.0049)	(0.0052)	(0.0060)	(0.0053)	(0.0062)	(0.0112)	(0.0110)	(0.0163)	(0.0136)	(0.0145)
State ownership	0.00082	-0.01116 ***	0.00364	-0.01296 ***	-0.00743 *	0.00442	-0.01467 ***	0.00306	-0.01993 ***	-0.01051 *	-0.01486	-0.00670	-0.00177	-0.00683	-0.00169
	(0.0037)	(0.0031)	(0.0045)	(0.0033)	(0.0043)	(0.0062)	(0.0039)	(0.0098)	(0.0043)	(0.0061)	(0.0102)	(0.0079)	(0.0255)	(0.0099)	(0.0133)
Foreign ownership of advanced economies	-0.01808 ***	-0.01178 ***	-0.02136 ***	-0.02090 ***	-0.01563 ***	-0.01537 ***	-0.01267 ***	-0.01787 ***	-0.01557 ***	-0.01286 ***	-0.03201 ***	-0.02169 **	-0.03159 ***	-0.02966 ***	-0.02645 ***
	(0.0022)	(0.0031)	(0.0026)	(0.0029)	(0.0030)	(0.0034)	(0.0042)	(0.0044)	(0.0043)	(0.0046)	(0.0078)	(0.0095)	(0.0112)	(0.0112)	(0.0101)
Foreign ownership of non-advanced economies	-0.01928 ***	0.00011	-0.02261 ***	-0.00641	-0.02049 ***	-0.00654	0.00394	-0.00698	0.01101	-0.01388 *	-0.02361 *	0.00237	-0.04666 **	-0.00835	-0.02785
	(0.0038)	(0.0048)	(0.0049)	(0.0051)	(0.0049)	(0.0061)	(0.0064)	(0.0090)	(0.0076)	(0.0074)	(0.0135)	(0.0157)	(0.0232)	(0.0179)	(0.0205)
Control variables															
Management complexity	-0.00536 ***	-0.00355 ***	-0.00536 ***	-0.00799 ***	-0.00703 ***	-0.00521 ***	-0.00362 ***	-0.00869 ***	-0.00658 ***	-0.00650 ***	-0.00373	-0.00728 **	0.00448	-0.00512	-0.00575
	(0.0011)	(0.0011)	(0.0016)	(0.0011)	(0.0014)	(0.0017)	(0.0014)	(0.0027)	(0.0014)	(0.0021)	(0.0042)	(0.0032)	(0.0078)	(0.0039)	(0.0047)
Firm performance	0.00096	0.00218 ***	0.00151 *	0.00150 *	0.00210 **	0.00123	0.00133	0.00355 **	0.00201 *	0.00219	-0.00123	-0.00073	0.00493	0.00127	-0.00018
	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0009)	(0.0013)	(0.0010)	(0.0016)	(0.0011)	(0.0014)	(0.0029)	(0.0024)	(0.0042)	(0.0026)	(0.0035)
Intercept	0.10169 ***	0.12973 ***	0.14253 ***	0.14250 ***	0.14757 ***	0.12697 ***	0.15907 ***	0.15923 ***	0.15977 ***	0.14099 ***	0.14571 ***	0.15400 ***	0.21128 ***	0.16240 ***	0.17446 ***
	(0.0052)	(0.0059)	(0.0066)	(0.0058)	(0.0079)	(0.0078)	(0.0078)	(0.0107)	(0.0083)	(0.0110)	(0.0219)	(0.0184)	(0.0369)	(0.0257)	(0.0276)
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6,448	6,473	6,162	7,338	4,481	3,584	5,507	2,755	5,052	2,766	769	1,077	516	872	630
R^2	0.05	0.06	0.05	0.05	0.05	0.03	0.06	0.04	0.05	0.06	0.04	0.03	0.07	0.04	0.05
F test	20.49 ***	22.02 ***	16.11 ***	36.89 ***	17.87 ***	5.37 ***	17.48 ***	5.93 ***	23.26 ***	11.88 ***	1.69 **	2.28 ***	1.90 ***	2.95 ***	2.01 **

Notes: The F test examines the null hypothesis that all regression coefficients are zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Table 1 provides detailed definitions and descriptive statistics of the variables used in estimations.

Appendix Table A1. Estimation results of principal component analysis

(a) Management complexity

Eigenvalue of the correlation matrix				Eigenvectors of the first component	
Component no.	Eigenvalue	Accounted for variance	Cumulative percentage of total variance	Variables	Eigenvector
1	1.6202	0.324	0.324	Listed firm	0.648
2	1.0758	0.215	0.539	Firm size	0.572
3	0.9920	0.198	0.738	Firm age	0.036
4	0.7887	0.158	0.895	Business diversification	0.469
5	0.5234	0.105	1.000	R&D intensity	0.178

(b) Firm performance

Eigenvalue of the correlation matrix				Eigenvectors of the first component	
Component no.	Eigenvalue	Accounted for variance	Cumulative percentage of total variance	Variables	Eigenvector
1	1.3278	0.443	0.443	Profitability	0.657
2	0.9466	0.316	0.758	Financial risk	-0.374
3	0.7256	0.242	1.000	Solvency	0.655

Note: Table 1 provides detailed definitions and descriptive statistics of the variables used in estimations.

Appendix Table A2. Correlation matrix of independent variables

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
[1] Inequality of human development	1.000																			
[2] Inequality of education	0.741	1.000																		
[3] Inequality of income	0.984	0.752	1.000																	
[4] Loss of human development due to inequality	1.000	0.744	0.987	1.000																
[5] Board size	0.102	0.057	0.087	0.100	1.000															
[6] CEO duality	-0.402	-0.336	-0.380	-0.401	-0.294	1.000														
[7] Ownership concentration	-0.535	-0.311	-0.504	-0.532	-0.213	0.304	1.000													
[8] State ownership	0.006	0.126	0.025	0.008	0.177	-0.066	0.119	1.000												
[9] Foreign ownership of advanced economies	-0.424	-0.286	-0.424	-0.424	-0.107	0.238	0.337	-0.107	1.000											
[10] Foreign ownership of non-advanced economies	-0.114	-0.043	-0.113	-0.113	-0.022	0.034	0.134	-0.017	-0.088	1.000										
[11] Listed firm	0.611	0.418	0.567	0.607	0.317	-0.506	-0.628	-0.063	-0.357	-0.117	1.000									
[12] Firm size	0.351	0.213	0.311	0.347	0.391	-0.280	-0.361	0.134	-0.134	-0.023	0.414	1.000								
[13] Firm age	-0.213	-0.111	-0.196	-0.211	0.181	-0.071	-0.009	0.065	-0.020	0.023	0.028	0.082	1.000							
[14] Business diversification	-0.450	-0.412	-0.450	-0.453	-0.001	0.297	0.229	-0.005	0.040	0.012	-0.327	-0.129	0.081	1.000						
[15] R&D intensity	0.049	0.031	0.046	0.049	0.094	-0.033	-0.040	0.030	-0.020	0.000	0.046	0.123	-0.003	-0.022	1.000					
[16] Management complexity	0.640	0.463	0.600	0.637	0.359	-0.501	-0.577	0.035	-0.260	-0.074	0.825	0.728	0.046	-0.597	0.226	1.000				
[17] Profitability	0.154	0.087	0.136	0.152	0.109	-0.088	-0.141	-0.016	-0.043	-0.028	0.143	0.135	-0.072	-0.051	0.016	0.154	1.000			
[18] Financial risk	-0.013	-0.014	-0.013	-0.013	-0.005	0.002	0.004	-0.003	0.001	0.001	0.000	-0.018	-0.001	-0.003	-0.002	-0.007	-0.120	1.000		
[19] Solvency	0.141	0.098	0.142	0.140	-0.051	-0.052	-0.141	-0.045	-0.086	-0.073	0.173	-0.058	0.005	-0.080	-0.005	0.091	0.684	-0.643	1.000	
[20] Firm performance	0.206	0.145	0.194	0.205	0.070	-0.124	-0.198	-0.023	-0.098	-0.065	0.222	0.106	-0.022	-0.089	0.011	0.193	0.757	-0.431	0.754	1.000

Note: Table 1 provides detailed definitions and descriptive statistics of the variables used in estimations.

Appendix Table A3. Estimation results of raw variables of management complexity

Dependent variable	Board generational diversity		
Sample firm	All firms	Chinese firms	European firms
Model	[1]	[2]	[3]
Inequality of human development	-0.00174 ***		
	(0.0003)		
Board composition			
Board size	0.00133 ***	0.00152 ***	0.00092 ***
	(0.0001)	(0.0001)	(0.0001)
CEO duality	-0.00139 **	-0.01505 ***	-0.00577 **
	(0.0006)	(0.0024)	(0.0025)
Ownership structure			
Ownership concentration	0.00762 ***	0.00584	0.00343
	(0.0026)	(0.0046)	(0.0030)
State ownership	-0.00454 *	-0.02630 ***	-0.00647 *
	(0.0026)	(0.0030)	(0.0037)
Foreign ownership of advanced economies	-0.01700 ***	-0.01156 **	-0.01562 ***
	(0.0021)	(0.0054)	(0.0023)
Foreign ownership of non-advanced economies	-0.01139 ***	0.01565 *	-0.01487 ***
	(0.0035)	(0.0090)	(0.0037)
Raw variables of management complexity			
Listed	-0.00230	0.01927 ***	-0.00418
	(0.0022)	(0.0031)	(0.0037)
Firm size	-0.00686 ***	-0.00545 ***	-0.00247 ***
	(0.0005)	(0.0006)	(0.0009)
Firm age	0.00018 ***	0.00039 ***	0.00006
	(0.0000)	(0.0001)	(0.0000)
Business diversification	0.00019	-0.00137	-0.00014
	(0.0002)	(0.0011)	(0.0003)
R&D intensity	-0.00026	-0.00002	-0.00004 ***
	(0.0005)	(0.0001)	(0.0000)
Control variable			
Firm performance	0.00151 ***	0.00250 ***	0.00062
	(0.0006)	(0.0008)	(0.0008)
Intercept	0.17080 ***	0.11066 ***	0.12884 ***
	(0.0052)	(0.0056)	(0.0065)
Industry-level fixed effects	Yes	Yes	Yes
Country-level fixed effects	No	No	Yes
N	12,635	6,187	6,448
R^2	0.06	0.08	0.10
F test	37.16 ***	29.95 ***	17.40 ***

Notes: The F test examines the null hypothesis that all regression coefficients are zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Table 1 provides detailed definitions and descriptive statistics of the variables used in estimations.