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Board Gender Diversity in China and Eastern Europe[*]

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Abstract: This paper reports on an empirical analysis of 42,094 public/private companies in China and 21 Eastern European countries to grasp the actual state and determinants of board gender diversity in emerging market firms. We confirmed that firms in these countries are comparable to those in advanced nations in terms of the prevalence of firms recruiting female board members and the female share of board directorships. Furthermore, in emerging market countries, internal promotions are used as often as, or even more often than, external ones to recruit women to director positions. The results revealed that board composition and ownership structure are important determinants of the gender diversity of the corporate board in emerging market firms. We also found that the effects of these factors vary significantly depending on the country/region and the listing status of firms and that two qualitatively different decision-making stages related to the appointment of women to board positions (i.e., a decision as to whether to appoint any women to the board and a decision as to how many board positions should be reserved for women) have a substantial impact on the empirical results.

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Keywords: board gender diversity, board composition, ownership structure, emerging markets, China, Eastern Europe

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1 Introduction

Academic interest in the organizational structure of boards of directors has been strongly influenced by the agency theory proposed by Jensen and Meckling (1976) and Fama and Jensen (1983). Many researchers today eagerly draw on this theory to explore whether, in a situation where ownership is separated from management, a board of directors can properly discipline managers toward maximizing firm value while restraining their opportunistic or otherwise inappropriate behavior. This perspective naturally draws the researcher's attention to the issue of board independence from top management. Therefore, many empirical studies on board structure have focused on identifying the share of outsider/independent directors on boards and its determinants and on examining how the independence of the board affects firm performance, executive compensation, and other firm characteristics (Croci, 2018). These issues will continue to attract a great deal of attention. Undoubtedly, many more such studies can be expected in the future because the oversight and control of corporate management continues to be the most important duty of the board of directors.

However, the complexity of the business environment has increased in recent years due to the globalization of economic activities, the multipolarization of the international political system, the rapid progress of information and communication technologies, the individualization and diversification of consumer behavior, and the emergence of new and serious social issues represented by keywords such as "climate change," "sexual minorities (LGBT)," and "social disparity." These economic and social changes that characterize the 21st century also foster academic interest in another primary function of the board of directors: the advisory function regarding management (Leblance, 2020; Sjåfjell and Bruner, 2020). As emphasized in the stewardship theory, the expertise and practical experience of directors have always been of extreme usefulness to managers in formulating corporate strategies and managing firm organizations (Idowu et al., 2013). The problem is that middle-aged and older men who have virtually dominated director posts for a long time may no longer be sufficiently qualified to provide the kind of knowledge and expertise needed by the managers of today's firms. This is why, in recent years, corporate board diversity not only has gained substantial public and media attention but has also become a hot topic of discussion among researchers of corporate finance and organizational economics (Anderson et al., 2011; Bernile et al., 2018).

Women's representation on corporate boards, or board gender diversity, has been of great interest to researchers as related to both the agency theory and the steward theory. The presence of women on the board is considered to have a certain effect on mitigating

agency problems because it is said that women, who generally have a strong sense of justice and responsibility, tend to devote greater attention and effort than men to their duties as insider or outsider directors (i.e., duties to preserve sound corporate management practices, including compliance with laws and regulations as insider directors, and duties to conduct management oversight, control, and financial auditing as outsider directors). At the same time, women can provide useful insights into corporate strategies and management operations by bringing their unique perspectives and experiences to the table (De Cabo et al., 2012; Abdullah et al., 2016; Tanaka, 2019). Obviously, this assumption has been tested in many published empirical studies targeting firms in advanced nations, including Farrell and Hersch's (2005) pioneering study of US firms. Empirical studies of board gender diversity in developed economies are accumulating every day. A few of these include studies on companies in the European Union by Cimini (2022), on Nordic firms by Garcia-Blandon et al. (2022), on US and European banks by Kara et al. (2022), on Italian firms by Maida and Weber (2022), on UK firms by Biswas et al. (2023), on US public companies by Gormley et al. (2023), and on Japanese corporations by Wang et al. (2024).

In contrast, studies of board gender diversity in China and Eastern Europe are surprisingly scarce, even though these emerging markets now form a significant pole of the global economy, along with developed economies. To our knowledge, fewer than 10 published board gender diversity studies on Chinese firms are available, including the latest studies by Ye et al. (2021), Wang et al. (2021), and Chu et al. (2023). Studies of Russian firms by Tleubayev et al. (2020) and Garanina and Muravyev (2021) are the only two studies on this topic available for Eastern European emerging market firms, and Saeed et al. (2016) is the only cross-national study of board gender diversity in emerging market firms.[1] Of these studies, only Saeed et al. (2016) empirically examines the determinants of board gender diversity. Obviously, the availability of studies on this topic is extremely limited for emerging market firms as compared to firms in advanced nations.

With the aim of filling this academic vacuum, this paper presents a comparative analysis of China and Eastern European countries to elucidate the gender diversity of corporate boards and to identify its determinants in the context of emerging markets. As described later, China and Eastern European countries that maintain or have experienced socialist regimes, driven by national policies for ideological reasons, have a history of promoting female labor participation and gender-equal treatment in the workplace.

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[1] Saeed et al. (2016) investigated non-financial companies in six countries: Brazil, China, India, Russia, the United Kingdom, and the United States.

Consequently, even today, these countries have relatively high female labor participation rates, and they are comparable to advanced nations with respect to the number of women holding management positions (Ma, 2021; Iwasaki and Satogami, 2023). Thus, women are presumed to have a relatively strong presence on the boards of firms operating in these emerging markets. However, the actual picture is hardly clear. Do we find significant differences in terms of the gender diversity of corporate boards between China and Eastern Europe? After all, differences in the transition process from the planned system to a market economy and the socioeconomic status of women in these countries are great, as are differences between public and private companies,[2] and the social standing of management and the legal and administrative regulations regarding board composition are very different. In this paper, we try to advance the literature on the board structure of emerging market firms by clarifying these research questions. The resolution of these issues also contributes to the literature by examining the generality of the empirical findings obtained from studies of firms in advanced nations.

To achieve the above-stated objectives, we employ a firm-level dataset covering 42,094 public and private companies in China and 21 Eastern European countries. In examining the determinants of board gender diversity, we adopt an approach that is almost unprecedented, even in studies of firms in advanced economies. This approach involves organizing an empirical analysis that divides female directors into subgroups of insider and outsider directors. We confirmed that firms in China and Eastern Europe are comparable to those in advanced nations in terms of the prevalence of firms recruiting female board members and the female share of board directorships. Furthermore, in these economies, internal promotions are used as often as—or even more often than—external promotions to recruit women to director positions. This strongly suggests the need for empirical analysis that takes into account differences in appointment routes. The results of our empirical analysis revealed board composition and ownership structure to be important determinants of the gender diversity of boards in emerging market firms. We also found that the effects of these factors on board gender diversity vary depending on the country/region and the listing status of firms and that two qualitatively different decision-making stages related to the appointment of women to board positions (i.e., the decision as to whether to appoint any women to the board and the decision as to how

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[2] In this paper, we define a public company (or publicly traded company) as a firm whose ownership is organized via shares of stock that are freely traded on a stock exchange or over-the-counter market. While a private company (or privately held company) is defined as a company whose shares are offered, owned, traded, and exchanged privately.

many board positions should be reserved for women) have a substantial impact on the empirical results.

The remainder of this paper is organized as follows: Section 2 argues for the importance of women's presence in corporate society in China and Eastern Europe. Section 3 presents a set of hypotheses regarding the determinants of board gender diversity in emerging market firms. Section 4 describes the data and methodology used for hypothesis testing. Section 5 overviews the gender composition of the corporate boards in sample firms. Section 6 reports the estimation results, and Section 7 summarizes the main findings and concludes.

2 Gender in Corporate Society in China and Eastern Europe

In general, gender in corporate societies is strongly influenced by the institutions and culture[3] that have been formed in those societies. In particular, in China and Eastern Europe, which have experienced economic development different from that of the developed countries, gender stands out for the specificities it entails in terms of both culture and institutions. This paper focuses on the institutional formation of emerging markets; however, it is important to confirm that cultural factors must not be ignored.

In addition to institutional factors, social culture or norms may also influence the gender gap in market work participation and job allocation in the workplace. Alesina and Giuliano (2013) highlighted that the economic environment and industrial structure could impact women's work participation and the allocation of household responsibilities, thus leading to differences in the social culture or norms over the long term. Several studies have examined how religion affects women's labor market participation and job allocation (Abdelhadi, 2019; Koburtay et al., 2020).

From a historical perspective of Chinese society, traditional cultural norms, exemplified by Confucianism's "Three Obediences (*Sancong*)" and "Four Virtues (*Side*)" for women, play a significant role (He, 2023). The Three Obediences dictate that a woman should be obedient to her father and older brothers in her youth, to her husband in married life, and to her son as a widow. The Four Virtues regulate feminine conduct, speech, comportment, and works. These norms have shaped a Chinese society where men are considered superior to women. This social culture continues to greatly influence Chinese awareness and behavior in the present period.[4]

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[3] Culture and institutions are complementary, and the same institution works differently in different cultures (Alesina and Giuliano, 2015).

[4] For instance, Xiao and Asadullah (2020) and Ma (2024) explored whether social norms such as

On the other hand, in Eastern European countries on the periphery of Europe and in the former Soviet region, the communal family was based on a patriarchal system. The vertical, male-dominated society formed a division of labor based on gender, and the status of women was relatively high (Todd, 1999).[5] However, if women were not only responsible for household, but also for agricultural work, it can be argued that the culture placed a heavy burden—a so-called dual responsibility—on women. Furthermore, there is a strong Islamic influence in this region, and gender inegalitarian tendencies may be naturally observed.

Historically, gender in corporate society has been strongly influenced by cultural factors (Alesina, et al., 2013); however, this paper sheds light on changes in corporate society following market transitions. Therefore, this section examines women's workforce participation in China and Eastern European countries in both historical and current contexts to provide background information regarding board gender diversity in these economies. Subsection 2.1 is dedicated to China and Subsection 2.2 to Eastern Europe.

2.1 China

During the era of the planned system (1949–1977), China valued the idea of gender equality as one of the pillars of its socialist ideology. It not only developed a legal system advocating gender equality in employment and wages but also implemented a series of labor policies aimed at realizing gender equality (Ma, 2021). The Common Program of the Chinese People's Political Consultative Conference, issued in 1949, played a pivotal role in this movement. Chapter 1, Article 6, of the statement, which stipulates that "women have equal rights with men in four areas, i.e., politics, economy, cultural education, and society," gave Chinese women the same legal rights as men for the first time. The Constitution of the People's Republic of China of 1954 included a provision that "women have the same rights as men in five areas, i.e., politics, economy, culture, society, and family," repeating the provision of the statement. "Men and women are equal, and what men can do, women can do" was a nationwide political slogan that took hold during the Cultural Revolution (1966–1976), which is another noteworthy historical event

gender role attitudes significantly affect women's participation in work and the gender wage gap in China. Based on a systematic review of 95 papers in the Chinese context, Yao et al. (2020) demonstrated that Confucianism influences career development. Additionally, some studies have found that Confucianism significantly affects the relationship between majority and minority shareholders (Du, 2015) and board gender diversity (Du, 2016) in Chinese corporations.

[5] The age difference between married couples is significantly smaller, which indicates an isoglossic relationship. Todd (1999) regards Scandinavia as the origin of this culture.

that may have played a role in gender equalization during the era of the planned system.

The Chinese government leveraged such legal provisions and political movements to implement a series of policies that promoted gender equality in employment opportunities and employment protection for women. For example, in 1951, the 73rd Session of the State Council of the People's Republic of China passed the Labor Insurance Regulations of the People's Republic of China, which introduced a maternity insurance system for female workers in the state sector and offered generous employment protection for pregnant and nursing female workers. Since the 1950s, many state-owned enterprises (SOEs) have established day-care centers and nursery schools to expand their support for working mothers and to meet their childcare needs.

The Chinese government's policies to promote gender equality gradually encouraged more women to find their place in corporate society throughout the period of the planned system. In fact, the representation of female workers in the total workforce, which was a meager 7.5% in the early years of the country's founding, increased to 11.7% by 1953. In 1957, the number of female workers reached 3,286,000 in urban areas—approximately 4.5 times the number in 1949—and the share of working-age women participating in the labor force reached approximately 90% (Women's Institute of the All-China Women's Federation, 1991; Tong, 1999). During this period, an increasing number of women found employment in male-dominated industries. This contributed to a narrowing of the gender gaps in employment, promotion, and wages, as pointed out by several researchers (Gustafsson and Li, 2000; He, 2017; Ma, 2021, 2022).

Even during the transition period, when China was undergoing a diversification of the corporate ownership structure and shifting to a market economy, the government established legal systems adapted to the new era to ensure a certain level of gender equality in the labor market. These measures included the Provisional Regulations on Labor Contract Systems for SOEs of 1986 and the Labor Protection Regulations for Female Workers of 1988, which emphasized gender non-discrimination in employment in order to protect the equal rights of women participating in the labor market. The Law on the Protection of Women's Rights and Interests of 1993 prohibits employers from denying employment opportunities to women or raising the employment standards for women while hiring. Additionally, in 1994, the Labor Law was enacted, which stipulated that "the distribution of labor income shall be based on performance of work and that the principle of equal pay for equal work shall be implemented equally between men and women."

Furthermore, the Law on the Protection of Women's Rights and Interests was

amended in 2005 to include the following new provisions: "The Company shall implement equal pay for equal work for both men and women. Women shall enjoy equal rights with men in terms of benefits and treatment" (Article 24). "The principle of gender equality shall be upheld in promotions, advancements, and the evaluation of professional and technical work, and women shall not be discriminated against" (Article 24). The Employment Promotion Law of 2008 also explicitly stated that "men and women enjoy equal rights to employment and free choice of work." As seen above, the Chinese government has enacted various laws that strongly urge its citizens to promote gender equality in the arena of work.

In sum, the Chinese government has vigorously promoted women's employment through legal and policy measures implemented from the period of the planned system to the transition period. As a result, China's female labor force participation rate is among the highest in the world. In fact, according to the World Bank, the female labor force participation rate in China reached 60.6% in 2019, far exceeding the global average of 47.3%, and higher than that of the United States (56.8%), the United Kingdom (58.1%), Germany (55.6%), and other advanced nations. It even exceeds that of Russia (54.6%), another country that has transitioned to a market economy.[6] The strong female presence in the Chinese workforce may have the effect of significantly boosting the share of women holding or promoted internally to management positions (Iwasaki and Ma, 2020). Although gender disparity in management positions was noted even during the transition period, Chinese firms (SOEs, in particular) have been strongly influenced by the gender-equality ideology of the socialist era. This is why the disparity is lower than in advanced nations that do not have a similar historical experience of dealing with gender-disparity issues (Lin and Deng, 2007; Shao and Zhou, 2021). In fact, according to Wan et al. (2018), in 2015, the share of women on corporate boards of Chinese firms was 30%, which is higher than the global average of 24% and ranks ninth among the 36 major countries in the world. This evidence is of particular interest because it relates to the subject of this paper.

Although, as mentioned above, China has established several equal employment laws and family support policies to promote female labor force participation as part of the socialist ideology since the socialist era, during the economic transition period, the influence of the government on human resource management and corporate governance declined due to SOE reform (Lin et al., 2020). Additionally, the private sector (e.g., privately owned enterprises, POEs) has developed with progressive market-oriented

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[6] See the website of the World Bank (https://data.worldbank.org.cn/indicator).

reforms. It has been pointed out that institutional non-compliance issues in the private sector are much more severe than those in SOEs in China (Ye et al., 2015). Market-oriented reform might diminish the influence of equal employment policies in the workplace, especially in POEs, leading to greater discrimination against women in recent years as compared to the past (Gustafsson and Li, 2000; He, 2017). Following the taste-based discrimination hypothesis (Becker, 1957), whenever employers, customers, and colleagues discriminate against women, it can create a gender gap in wages and managerial promotion, potentially affecting board gender diversity.

2.2 Eastern Europe

Eastern European countries resemble China, in that the establishment of socialist regimes provided an opportunity, albeit formal, for the emancipation of women and their formal participation and inclusion in labor, education, and politics. Adequate legal protections, such as the Stalin Constitution of 1936, were introduced to protect women and improve their status in these countries. Many Eastern European countries removed restrictions on the jobs women were allowed to perform and, in the 1960s, made work compulsory for both men and women. Constant labor shortages in the growth-oriented socialist economies also encouraged more women to enter the workforce (Kornai, 1980).

As a result, female labor force participation rates rose markedly in the Soviet Union and other Eastern European countries (Ashwin, 2000). Female labor force participation rates were higher in the Soviet Union and East Germany than in Poland and Hungary, where a greater degree of liberalization had been achieved. Despite such regional differences, females were present in the workforce at a generally higher rate in the Eastern European socialist economies than in Western capitalist economies (Roth and Walker, 2019). In the Soviet Union, the share of women in the workforce rose from 38.9% in 1940 to 50.8% in 1970, exceeding the share of men in the workforce. The share of working-age women participating in the labor force reached approximately 79% in 1987 (State Statistics Committee of the USSR, 1987). During this period, in many Eastern European countries, women formed the majority in the fields of finance, distribution, public services, education, and culture (Iwasaki and Satogami, 2023).

As part of the process of transitioning from a planned system to a market economy, the governments and parliaments of Eastern European countries all began to develop legal systems that guaranteed equal opportunities for women to participate in the labor force and in management and leadership positions. Indeed, the constitutions of all Eastern European countries provide for gender equality and prohibit gender discrimination in

employment.[7] The mentality of the socialist era, which favored women's participation in the labor force, is deeply rooted in these Eastern European countries and exerts a strong influence on women in terms of willingness to work (Ashwin, 2005). In Russia, for instance, the female labor force participation rate dropped temporarily after the collapse of socialism, then rose suddenly in 2000, and remains high to this day. There has, in fact, been a substantial increase in the share of working-age women participating in the labor force—from 60.1% in 1995 to 67.1% in 2005, 70.8% in 2010, and 79.3% in 2018.[8] Other Eastern European countries also have generally high female labor force participation rates (Iwasaki and Satogami, 2023). Women's educational attainment in these countries has been high since the socialist era and increased significantly during the period of transition to a market economy. This is believed to be one factor underlying the relatively high female labor force participation rates (Mertus, 1998; Horie and Iwasaki, 2023).

Considering that these countries have long been committed legally to gender equality and have maintained high levels of female labor force participation, the share of women holding management positions is also expected to be relatively high. According to a labor market survey conducted in Russia in 2019, the share of women in corporate executive positions is 41%, which is among the highest in the world (NAFI Research Center, 2020).[9] On the other hand, the share of firms with women in top management positions varies greatly among the former Soviet Union and Eastern European countries, ranging from 0% in Kosovo to 33% in Belarus. The average across these regions, including Russia, is 20%, which compares favorably with the rates of other countries (IFC, 2014).

The promotion of measures to correct gender disparities in the European Union (EU) and the globalization trend also seem to be playing a part in strengthening women's positions in corporate society in Eastern Europe, in particular, by increasing the number of firms appointing female directors. For example, a gender quota target has been adopted

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[7] Some Eastern European countries have adopted labor laws that define industries and fields of work in which women are prohibited from working, due to the risks associated with gender differences (Mertus, 1998). For example, Poland's 1996 amended Labour Code identified more than 90 occupations across 20 sectors in which women were prohibited to work. The Czech Labour Code also defined prohibited sectors, such as mining and extraction. Similarly, Russia designated occupations such as chemical production, mining, and shipbuilding as sectors prohibited for women. However, the scope of restrictions on women's occupations is shrinking. Indeed, Russia's 2021 amended Labour Code lifts the ban on more than 350 of the 456 prohibited jobs (Rozhanovskaya and Pardini, 2020).

[8] See the website of the Russian National Statistics Office (https://www.gks.ru).

[9] Grant Thornton (2012) reported that the female share among senior managers in Russia was 46%, which corresponded to the research result of the NAFI Research Center.

by Eastern European EU member states to ensure that a certain proportion of the seats on the corporate board is granted to women—a measure intended to encourage more women to take leadership roles in business. In November 2013, the European Parliament adopted the EU Quota Directive, which requires large firms and publicly traded companies to reserve at least 40% of non-executive director seats for women by 2020. The directive contains penalties (exclusion from public tenders, etc.) for firms failing to introduce transparent appointment procedures.[10] Eastern European countries that have joined the EU are not free from this directive. Multinational enterprises have tapped into Eastern European markets in great numbers, and international standards of corporate governance have gradually taken root in the region, which may also strongly encourage Eastern European firms to appoint more female directors.

In the following sections, we will utilize a large firm-level dataset that extensively covers Eastern European countries to shed light upon and identify the determinants of female director hiring practices in Eastern Europe as well as China.

3 Hypothesis Development

This section presents a set of hypotheses regarding the factors that potentially determine board gender diversity in emerging market firms, drawing on the discussion in the previous section and the empirical results of previous studies.

The first three hypotheses to be tested in this paper are related to the effects of the composition of the board of directors on board gender diversity, namely board size, chief executive officer (CEO) duality, and board dependence.

An increase in board size has the advantage of expanding the functions of the board by bringing various talents and perspectives to the board. Firms that organize large boards do so to increase diversity in boardrooms (Kang et al., 2007). De Cabo et al. (2012) claim that the presence of a large board signals that the management of that firm is not so concerned about oversight from the board, but rather seeks to bring more diverse talents to the boardroom to strengthen the board's decision-making and management-oversight roles. Furthermore, De Jonge (2014) argues that a larger board means access to a wider network of expertise and, therefore, a greater chance of finding women among the candidates nominated to the board of directors. We believe that the arguments of these studies would apply to both insider and outsider directors. Hence, we propose the following hypothesis regarding the size and gender diversity of a board:

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[10] Although the directive was suspended by the European Council, a conditional agreement was subsequently reached, making it legally effective.

Hypothesis 1: *A larger board size has the effect of promoting the gender diversity of both insider and outsider directors serving on the board.*

Because corporate managers are generally averse to board oversight and supervision, they have a strong incentive to organize a board consisting of members who are sympathetic to their demands and requirements. This propensity is noted to be particularly strong in emerging markets (Mickiewicz, 2006; Boubaker and Nguyen, 2014). As repeatedly pointed out by many researchers, if director heterogeneity increases oversight and control over management, managers will seek to encourage greater homogeneity (less heterogeneity) on their boards (Anderson et al., 2011). Managers seeking to organize a homogeneous group of directors will try to appoint manager-friendly candidates to their boards. This implies that, in the context of male-dominated boards, women are regarded as an "annoyance," as observed by De Cabo et al. (2012). In other words, managers who prefer to avoid agency conflicts are unlikely to appoint women to their boards (Tanaka, 2019). Thus, we expect that firms where the CEO also serves as the board chairman are less likely to appoint women to their boards:

Hypothesis 2: *CEO duality has an inhibitory effect on the gender diversity of both insider and outsider directors serving on the board.*

Several studies have demonstrated that female directors tend to be more concerned with identifying and assessing financial and managerial risks than men are. Indeed, many of them have professional experience in the legal, accounting, and financial fields, which makes them highly qualified to serve as monitors of corporate management (Abdullah et al., 2016; Hewa-Wellalage et al., 2022). Outsider directors, who are primarily responsible for the oversight and control of corporate management, would therefore be strongly motivated to have women from outside the firm in the boardroom as their colleagues (Tanaka, 2019). In other words, boards with a greater share of non-executive directors are more likely to have greater gender diversity among outsider directors (De Cabo et al., 2012; Boubaker et al., 2014). At the same time, however, it is pointed out that women are often tough negotiators and are known to have a strong tendency to avoid responsibility (Frye and Pham, 2018; Eckel et al., 2021). For this reason, when other conditions are held constant, outsider directors may not feel comfortable having women join the board as executive directors who are subject to their oversight and control (Tanaka, 2019). Hence, we propose the following hypothesis regarding how board independence from management affects gender diversity on boards:

Hypothesis 3: *Board independence from management promotes gender diversity among outsider directors, while it suppresses gender diversity among insider directors.*

The remaining three hypotheses to be empirically examined in this paper are related to the effects of ownership concentration and state/foreign ownership.

Kang et al. (2007) pointed out that the more diverse the shareholders, the stronger the demand for organizing a broadly represented board. This is because minority shareholders can expect greater oversight and control from a heterogeneous rather than homogeneous pool of directors. Conversely, many previous studies have shown that major shareholders who are strongly motivated to exercise direct oversight and control over top management do not necessarily require a broadly represented board. Major shareholders in emerging markets have also been shown to have a strong tendency to prefer direct negotiations with management rather than to exercise oversight and control over corporate management through the board (Iwasaki, 2008; Iwasaki and Mizobata, 2020). These arguments lead to the following hypothesis regarding the association between the concentration of ownership and board gender diversity:

Hypothesis 4: *Ownership concentration has an inhibitory effect on board gender diversity.*

Some argue that the participation of state and foreign investors in management through the acquisition of shares enhances the quality of corporate governance of the firm they invest in by enhancing board gender diversity. SOEs are expected to showcase compliance with government policies and serve as a leading example for private counterparts in the country (Mensi-Klarbach et al., 2021). When SOEs organize gender-balanced boards, they are demonstrating to the citizens that their government is committed to the policy of enhancing gender diversity and women's social empowerment. For this reason, it is argued that SOEs are more likely than private firms to form a gender-diverse board of directors (Saeed et al., 2019). On the other hand, foreign investors, who are keen on minimizing the risk of investing their funds across borders, are more likely to demand stricter oversight and control over the firms they invest in than are their domestic counterparts. If foreign investors feel that female directors are capable of effectively fulfilling such roles, they are expected to eagerly support the appointment of women to boards (Tanaka, 2019). Indeed, Wan et al. (2018) report that the share of female directors in Chinese A-share listed companies is higher among foreign firms than among private and SOEs in the country.

The practical relevance of the preceding arguments, however, seems to rely heavily on the nationality of both the state and the foreign investors. Saeed et al. (2016) made some interesting remarks in this regard that the lack of gender diversity on the boards of SOEs in emerging markets is largely attributable to the fact that politics is a male-

dominated arena in these economies. The Russian government under Vladimir Putin, for example, is characterized by strong male dominance. Indeed, Johnson (2013) argues that Russian elites are predominantly men who are united under President Putin's banner of masculinity. The fact that approximately 35% of new appointees (many of whom are former military or intelligence officers) to top-level government positions under Putin's control are sent to the corporate sector to implement government policies may explain the presence of large gender disparities in the top management of Russian SOEs. Investors from emerging markets and other developing economies may not be totally immune to this idea of male superiority that, according to Saeed et al. (2016), pervades the governmental bodies of emerging market countries.

Hence, we propose to test the following two hypotheses regarding the effect of state and foreign ownership of emerging market firms on board gender diversity:

Hypothesis 5: *State ownership of firms in China and Eastern European countries has an inhibitory effect on board gender diversity.*

Hypothesis 6: *Ownership of firms by foreign investors from advanced nations promotes board gender diversity, whereas the ownership of firms by foreign investors from developing countries and emerging markets has an inhibitory effect on board gender diversity.*

In addition to the aspects of board composition and ownership structure mentioned in the six hypotheses described above, we also look into other factors that may affect board gender diversity in emerging market firms, including firm size, firm age, profitability, financial risk, solvency, business diversification, and innovativeness. Prior studies have contemplated the possible effects of these seven factors on board gender diversity as follows:

Large firms, regarded as the "public institutions of society," are often the subject of public scrutiny, which puts them under greater pressure from the public to promote gender diversity than smaller firms (Iwasaki and Mizobata, 2024). Other conditions being equal, managers and directors of large corporations would be willing to appoint women to their boards. Companies that have been in operation for a long time are often confronted with a complex business environment and have greater need for a diverse board capable of offering effective advisory services. Thus, older firms are more likely to have female directors (Tanaka, 2019; Iwasaki et al., 2024).

It is pointed out that, as women are sensitive to social reputation and cautious in their investment decisions, they tend to avoid serving on boards of high-risk firms (Martín-Ugedo and Minguez-Vera, 2014; Tanaka, 2019; Farooq et al., 2022). On the other hand,

firms operating in high-risk environments require homogeneous boards for swift decision making and tight organizational control (Iwasaki, 2008; De Cabo et al., 2012). For these reasons, we predict that women are less likely to join the boards of firms with low earnings and high financial risk/leverage.

Business diversification entails an increase in the complexity of the management environment triggered by the expansion of markets entered and the geographic scope of business activities, as well as the shift from a unitary form (U-type) organization to a multidivisional (M-type) structure. Increased complexity raises the demand for directors' talents, perspectives, and problem-solving skills (Anderson et al., 2011; Iwasaki et al., 2023), which inevitably causes firms to place more value on the unique perspectives and knowledge of female directors (Hillman et al., 2007). Business diversification would therefore encourage the firms to appoint more women to director positions. On the other hand, due to their technological uncertainty, innovation activities make it necessary to evaluate the performance of management not in terms of financial performance but in terms of the quality of decision making. Such performance evaluation can only be carried out by internal directors. Furthermore, as noted above, innovation investment also entails a high risk of business failure, which women tend to avoid. These characteristics of innovation activities would probably have a negative effect, especially on the appointment of female outsider directors (Tanaka, 2019).

Based on the discussions of the previous studies summarized above, we expect that five factors—firm size, firm age, profitability, solvency, and business diversification—are positively correlated with the appointment of female directors, while the remaining two factors, financial risk and innovativeness, are associated negatively with female director appointment. Therefore, we will simultaneously control for these seven factors to test the hypotheses regarding the impacts of board composition and ownership structure on board gender diversity in the regression analysis.

4 Data and Methodology

To test the set of hypotheses described in the previous section, we utilize Orbis, a company database compiled by Bureau van Dijk, a company of Moody's Analytics, to derive firm-level data for our empirical analysis. As of 2023, Orbis is the largest commercial database of records, covering over 400 million firms and organizations from various industries around the world, and it provides an abundance of information on public/private companies in China and Eastern European countries. Apart from financial statements of each registered company, Orbis also contains information on board

composition and ownership structure, which makes it a useful source of information for our empirical study.[11]

The data related to board composition disclosed by Orbis provides information on not only the total number of directors but also the gender and job title of each director, which allows us to identify, for each firm and for each subgroup of insider and outsider directors, female representation on a board and the number of female directors. Taking advantage of this feature, we extracted from Orbis those public and private companies operating in China and 21 Eastern European countries[12] as of the first quarter of 2020 for which information on the gender and job title of all directors was available. The final sample is comprised of 42,094 firms, which include 10,571 Chinese public companies, 1,967 Eastern European public companies, 3,757 Chinese private companies, and 25,799 Eastern European private companies.[13] Taking the issues of interest mentioned in the Introduction into consideration, i.e., the difference in the process of systemic transformation to a market economy, the socioeconomic status of women, the level of social interest in corporate management between China and Eastern Europe, as well as the difference in the social standing of management and legal and administrative regulations regarding board composition between public and private companies, empirical tests of the hypotheses are conducted for each of these four firm types, and the results are compared with each other.

Table 1 shows the breakdown of the 42,094 sample companies by firm type, number of employees, and industry sector. As shown in the table, our sample covers firms of various sizes in a wide range of industrial sectors and is sufficiently representative of the firms in China and Eastern European countries in light of the official statistics available from them. When compared to the actual firm population, our sample has a relatively small proportion of small and medium enterprises (SMEs) with fewer than 100 employees. This is mainly because the number of SMEs with a board is limited compared to their larger counterparts with more than 100 employees. We have confirmed that our sample is

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

[12] The Eastern European countries include Albania, Bosnia and Herzegovina, Bulgaria, Belarus, Czech Republic, Estonia, Croatia, Hungary, Kosovo, Lithuania, Latvia, Moldova, Montenegro, North Macedonia, Poland, Romania, Serbia, Russia, Slovakia, Slovenia, and Ukraine.

[13] The sample of Chinese public companies includes publicly traded over-the-counter (OTC) companies, which are registered in the Orbis database as listed firms in addition to those listed on stock exchanges. The relatively small number of Chinese private companies in the sample in comparison with the actual total company population is due to the limited information disclosed on board composition.

not biased in any other way.

In this paper, we estimate the following regression equation using the board gender diversity (*gender_diversity*) of the *i*-th sample firm as the dependent variable and board composition (*board_composition*), ownership structure (*ownership*), and other factors that can affect board gender diversity (*control*) as the independent variables:

$$gender\_diversity_i = \mu + \sum_{n=1}^{3} \beta_n \cdot board\_composition_{i,n} + \sum_{m=1}^{4} \gamma_m \cdot ownership_{i,m}$$
$$+ \sum_{l=1}^{7} \delta_l \cdot control_{i,l} + \theta_j + \varphi_k + \varepsilon_i, \quad (1)$$

where μ is a constant term, β, γ, and δ are the parameters to be estimated, θ is the fixed effects of the *j*-th industry to which the *i*-th firm belongs, φ is the fixed effects of the *k*-th country in which the *i*-th firm resides, and ε is a disturbance term.

Depending on the hypothesis to be tested, nine variables, consisting of the probability of having female directors in the boardroom, the number of female directors, and the Blau index of diversity (*BI*, calculated by the following equation) for each of the three director types (i.e., all directors, insider directors, and outsider directors), are introduced on the left-hand side of Eq. (1).

$$BI = 1 - \sum_{i=1}^{n} P_i^2 = 1 - (female\_share^2 + male\_share^2), \quad (2)$$

where P_i is the share of category *i* in the total, *female_share* is the female share of board directorships, and *male_share* is the share of male directors. As shown in the rightmost part of Eq. (2), the Blau index fluctuates between a minimum of 0.0 and a maximum of 0.5 because our analysis deals with two categories.

Taking account of the characteristics of these dependent variables, different estimators are applied to estimate the regression equation based on which dependent variable is introduced on its left-hand side. Namely, a probit estimator is used for the model with a probability of having female directors in the boardroom, a Poisson estimator for the model with the number of female directors, and a Tobit estimator with 0.0 and 0.5 as the lower and upper thresholds for the models with *BI*. In cases where the number of female directors and the *BI* are taken as the dependent variables, we test the statistical robustness of our estimation results by estimating a Heckman two-step model that addresses the sample selection problem arising from the decision to or not to have women on the board. The statistical significance of regression coefficients is tested by using heteroscedasticity-consistent robust standard errors.

As shown in the second term on the right-hand side of Eq. (1), to test hypotheses 1

through 3, three variables are used to capture board composition: (a) board size as measured by the total number of board members, (b) a dummy variable that takes the value of 1 when the same person holds both the CEO and board chairperson positions in a firm, and (c) board independence calculated as the ratio of outsider/independent directors to all directors. Furthermore, as indicated in the third term on the right-hand side of Eq. (1), to test hypotheses 4 through 6, four variables are used to represent an ownership structure: (a) ownership concentration as proxied by the average ownership share per shareholder/member, (b) a dummy variable for SOEs, (c) a dummy variable for firms with foreign owners from advanced economies, and (d) a dummy variable for firms with foreign owners from developing/emerging economies. These seven variables, which constitute the key variables in our hypothesis testing, are estimated simultaneously with seven control variables that correspond with the discussion in the previous section. They consist of (a) firm size as represented by the log of the total number of employees; (b) firm age, signifying the number of years in operation; (c) profitability calculated as the profit margin on total sales; (d) financial risk expressed in terms of ROA volatility; (e) solvency as measured by a solvency ratio; (f) the degree of business diversification as measured by the number of operating industries based on the second digit of the NACE Rev. 2 sector classification; and (g) innovativeness as proxied by the log of the total number of patents.

The above 14 independent variables are all predetermined for the dependent variables. Specifically, all nine types of board gender diversity variables capture circumstances during the first quarter of 2020, whereas three variables, profitability, financial risk, and solvency, take either a mean or standard deviation calculated for the period extending from 2017 to 2019 as their value, and the remaining independent variables are given values corresponding to 2019. In this way, we can avoid endogeneity arising from simultaneous causality between dependent and independent variables. Industry-level fixed effects θ are controlled for by combining 13 industry dummy variables that use manufacturing industry as a reference category. On the other hand, when Eastern European firms are analyzed, state-level fixed effects φ are controlled for by combining 20 state dummy variables that use Russia as the reference category.

Table 2 shows the names and definitions of the nine dependent variables and 14 independent variables described above and provides the descriptive statistics for these variables by firm type.[14]

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[14] We confirmed that the correlation coefficients of the independent variables are well below the threshold of 0.70 for possible multicollinearity in all combinations. Preliminary estimation work

5 Board Gender Diversity in Chinese and Eastern European Firms: A Statistical Overview

To better understand the estimation results reported in the next section, this section presents a statistical overview of how gender diverse the corporate boards of the 42,094 sample firms are.

According to the data described in the previous section, the 42,094 firms in our sample have a total of 61,490 women on their boards as of the first quarter of 2020, an average of 1.46 female directors per firm. The number of female directors per firm type is 16,289 for Chinese public companies, 6,151 for Eastern European public companies, 2,139 for Chinese private companies, and 36,911 for Eastern European private companies. **Figure 1** shows the job composition of female directors for each of the four firm types. As shown in the figure, we classified insider directors into four categories, namely (a) top management (CEO, president, general director, etc.), (b) other executive officers (vice president, CFO, etc.), (c) non-executive managers, and (d) other internally appointed directors, and outsider directors into two categories, namely (a) independent directors[15] and (b) other outsider directors. The figure shows the number of female directors in each of these six categories and their share of the total. Evidently, in China and Eastern European countries, independent directors make up only a tiny proportion of all female directors even among public companies, and their presence is quite limited to say the least compared to that in firms in advanced nations.

What is most noteworthy about **Figure 1** is that the internal appointment routes are shown to be the most promising path to director positions for women in Chinese and Eastern European firms. In fact, of the 61,490 female directors, 33,890 (55.1%) have been promoted internally to director positions. The share of female insider directors among all female directors by firm type is 57.5% (9,370 out of 16,289 female directors) for Chinese public companies,[16] 40.4% (2,487 out of 6,151) for Eastern European public companies,

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also revealed that the variance inflation factors (VIFs) computed for the independent variables are all below 5.0.

[15] Note that the term "independent director" here refers to a person whose profession is registered with Orbis as a lawyer, accountant, tax accountant, university faculty, or other confirmed outside expert in company management and does not necessarily correspond to the definition of independent director provided by company law or other regulations in each country.

[16] Liu et al. (2014) reported that 65% of female directors working in more than 2,000 Shanghai and Shenzhen listed companies were executive directors or in other management positions, which is largely consistent with our findings.

62.5% (1,337 out of 2,139) for Chinese private companies, and 56.1% (20,696 out of 36,911) for Eastern European private companies. Only Eastern European public companies were found to have boards of directors with a majority of their female members consisting of outsider directors. The US study by Farrell and Hersch (2005) and the Ghanaian study by Appiah et al. (2016) looked into the differences in female director appointment routes and found that over 80% of female directors in these countries had been appointed externally, which stands in sharp contrast to how female directors are elected in China and Eastern European countries, as discussed in Section 2.

Figure 2 shows the number of female directors hired per firm and the number of female directors per 1,000 employees by firm type and industry sector. As shown in Panel (a) of the figure, Eastern European public companies operating in various industries have at least 2.5 female directors per firm. In contrast, both Chinese public companies and Eastern European private companies have between 1 and 1.5 female directors per firm, while Chinese private companies only have 0.5 female directors per firm. Chinese and Eastern European firms' commitment to board gender diversity seems to vary greatly depending on the country or region they reside in or their listing status, which is precisely why intercomparisons between different types of firms could be key to discovering valuable facts.

Many previous studies, including Hyland and Marcellino (2002) and Brammer et al. (2007), have highlighted striking differences in the levels of board gender diversity across industrial sectors, and this trend is also apparent in our sample firms, in particular, Eastern European firms, when differences in firm size across industrial sectors are taken into account. Specifically, as shown in Panel (b) of **Figure 2**, Eastern European public companies operating in the agriculture, forestry, and fishing industry, waterworks industry, real estate industry, and professional/scientific/technical service industry and Eastern European private companies operating in the agriculture, forestry, and fishing industry, accommodation and food service industry, real estate industry, and professional/scientific/technical service industry have a particularly large number of women serving on their boards compared to their counterparts in other industrial sectors. On the other hand, differences in the levels of board gender diversity across industrial sectors are less marked among Chinese firms. The control of industry fixed effects is therefore likely to have greater significance in the empirical analysis of Eastern European firms than in that of Chinese firms.

Based on the above findings, we next use the dependent variables in Eq. (1) (i.e., the probability of having female directors in the boardroom, the number of female directors,

and the *BI*) to shed light upon the realities of board gender diversity in China and Eastern European countries.

Table 3 shows the share of 42,094 sample firms having at least one woman on their board by firm type and director type. As shown in the table, 82.9% of the Eastern European public companies have at least one female director (including both insider and outsider directors) on their boards, followed by 67.2% of the Eastern European private companies and 57.6% of the Chinese public companies. On the other hand, the share of Chinese private companies having at least one female director on their boards stands at a meager 34.8%. According to previous studies on the share of firms in developed economies having female directors, 62.8% of US firms had female directors in 1996–2010 (Sila et al., 2016), 51.0% of European commercial banks had female directors in 1998–2004 (De Cabo et al., 2012), 42.0% of large Spanish firms had female directors as of 2014 (Ein et al., 2019), 19.0% of Japanese firms had female directors as of 2011 (Morikawa, 2016), and 6.0% of Italian listed firms had female directors in 2008–2010 (Bianco et al., 2015). These findings suggest that firms in emerging markets, even Chinese private companies, are not far behind their counterparts in advanced nations in terms of how open their boards are to female membership. Looking at the share of firms having a specific type of female directors (insider or outsider directors), this share exceeds 50% only among Eastern European public companies, although this does not cause much change in the relative merits of different firm types. Clearly, Eastern European firms are more committed than Chinese firms, and public companies are more committed than private companies, to electing more women to serve on their boards.

Figure 3 shows the number of women serving on the boards of firms that have at least one female director on their board. This figure clearly indicates that, regardless of the location, firm type, or director type, the overwhelming majority of the sample firms have only one or two women on their boards. This trend corresponds well with the findings reported in previous studies of firms in developed economies, such as Farrell and Hersch (2005) and De Cabo et al. (2012). As reported in **Table 2**, the average board size is 9.2 for Chinese public companies, 15.5 for Eastern European public companies, 5.0 for Chinese private companies, and 5.8 for Eastern European private companies, indicating that the share of women in the boardroom falls within the range of 0.0% to 30.0% for most firms. Indeed, the mean (median) share of women in the boardroom by firm type is 17.9% (12.5%) for Chinese public companies, 21.3% (18.2%) for Eastern European public companies, 12.3% (0.0%) for Chinese private companies, and 24.0% (25.0%) for

Eastern European private companies.[17] Similar results can be observed even when we look at the share of female insider directors or female outsider directors in the boardroom by firm type.[18] It is noteworthy that the share of women in the boardroom of emerging market firms is as high as that of firms in North America and Northern Europe and generally exceeds that of firms in other developed and developing economies, as demonstrated by international comparisons by Terjesen and Singh (2008) and De Cabo et al. (2012). As pointed out in Section 2, this can be attributed to the high female labor force participation rates in China and Eastern Europe brought about by the historical circumstances in these regions.

The above observations suggest that the degree of board gender diversity of our sample firms, as measured by the *BI* calculated using Eq. (2), is likely to show an extremely skewed distribution regardless of firm type or director type. **Figure 4** reveals that this prediction is true, especially for Chinese firms. According to Panel (a) of the figure, 41.6% or 4,393 of the Chinese public companies and 56.9% or 2,137 of the Chinese private companies had a *BI* in the range of 0.000 to 0.049, which signifies that the board is almost completely dominated by a single sex (in this case, male). The share of Eastern European firms whose *BI* falls within this range is a mere 16.9% or 333 of public companies and 33.0% or 8,512 of private companies. As shown in panels (b) and (c) of **Figure 4**, however, when we narrow the scope to female outsider directors or female insider directors, the difference between Chinese and Eastern European firms in terms of the distribution of *BI*s is substantially reduced. In general, most Chinese and Eastern European firms are rather reluctant to open their boards to women and have yet to take their first step toward gender diversity. At the same time, there certainly exist a handful of firms that have succeeded in achieving or are on their way to achieving gender equality on their boards. In any case, what particularly stands out concerning our sample firms is the kind of polarization phenomenon exhibited in **Figure 4**.

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[17] These ratios of female directors in our sample firms are slightly higher than those reported in the Eastern European study by de Cabo et al. (2012), the Chinese studies by Zhou (2019), Mirza et al. (2020), and Wang et al. (2021), the Chinese and Russian studies by Saeed et al. (2016), and the Russian study by Garanina and Muravyev (2021). This is probably mainly due to the fact that the observation period in the present study is several years ahead of these previous studies.

[18] In fact, the mean (median) ratio of female in-house directors to all in-house directors is 18.5% (0.0%) for Chinese public companies, 21.8% (14.3%) for Eastern European public companies, 12.4% (0.0%) for Chinese private companies, and 23.5% (16.7%) for Eastern European private companies; similarly for outsider directors, it is 16.9% (0.0%) for Chinese public firms, 30.8% (16.7%) for Eastern European public firms, 10.2% (0.0%) for Chinese private companies, and 40.4% (20.0%) for Eastern European private companies.

6 Estimation Results

Reporting the estimation results of Eq. (1), this section identifies the factors underlying the realities of the board gender diversity of firms in China and Eastern Europe described in the previous section. Subsections 6.1, 6.2, and 6.3 examine the effects of board composition and ownership structure on the probability of having a female director(s) in the boardroom, the number of female directors, and the *BI*, respectively. Subsections 6.4 and 6.5 discuss the estimation results of control variables and industry fixed effects.

6.1 Probability-of-female-director-appointment model

The estimation results of the probit regression model, in which the probability of having a female director(s) in the boardroom was used as the dependent variable, are reported in **Table 4**. The table has results for a total of 12 models, which correspond to three female director types and four firm types.[19]

In **Table 4**, the variable of board size shows a positive coefficient, ranging from 0.03643 to 0.30558 with statistical significance at the 1% level, in all 12 models. This is in agreement with Hypothesis 1 and clearly indicates that an increase in board size presents important opportunities for emerging market firms to open their boards to women regardless of their appointment route. The coefficient of CEO duality is estimated to be significant and negative—taking values from -0.38923 to -0.10581—in the five models that target Eastern European firms, which is consistent with our expectation expressed in Hypothesis 2. This finding suggests that, other things being equal, CEOs of Eastern European firms are inclined to avoid having any woman on the boards under their control. CEO duality produces significantly positive or positive but insignificant coefficients for Chinese public companies, while for Chinese private companies, it produces significant and negative coefficients in the models that are subject to all directors or insider directors; on the other hand, CEO duality produces significantly positive coefficients in the models that target outsider directors. These results indicate that top-level executives in Chinese firms who have tremendous decision-making authority as a result of assuming dual roles of CEO and board chairman are willing to hire

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[19] As shown in **Table 4**, a total of 35,991 observations were used in the estimation: 9,905 Chinese public companies, 1,643 Eastern European public companies, 1,773 Chinese private companies, and 22,670 Eastern European private companies. This implies that 6,103 firms were dropped from the regression estimation because they did not have all the independent variables required for estimation, but there were hardly any statistically significant differences in the dependent variable, independent variables, and industry sector composition between these dropped and retained firms.

women as outsider directors; this contrasts sharply with the effect that CEO duality seems to exert on firms in advanced nations and Eastern European countries. The board independence variable is given a significant and negative coefficient—from -0.03889 to -0.01694—in all four models for insider directors and a significant and positive coefficient—from 0.01121 to 0.05341—in all four models for outsider directors. This provides strong support for Hypothesis 3, irrespective of the location and listing status of the sample firms.

The effect of ownership structure is more uncertain and limited than that of board composition. Indeed, our expectation regarding ownership concentration outlined in Hypothesis 4 held true only for Chinese public companies, and in respect to Eastern European firms, ownership concentration shows a positive effect. Estimates of the dummy variable for SOEs support our expectation outlined in Hypothesis 5, indicating that state ownership tends to exert a negative impact on the internal appointment of female employees to the board for all firm types except Eastern European firms. However, the variable also shows that state ownership did not have any noticeable impact on the external appointment of women to the board for any of the firm types. The dummy variable for firms with foreign owners from advanced economies is confirmed to have a negative sign whenever it is estimated to be statistically significant, suggesting that foreign investors and firms from advanced nations are reluctant to have women on the boards of the emerging market firms they invest in, contrary to Hypothesis 6. At the same time, it is also found that the presence of investors and firms from developing and emerging countries is likely to discourage the opening of boards to women for Eastern European private companies only, which implies that the effect predicted in the latter half of Hypothesis 6 may have limited applicability.

6.2 Number-of-female-directors model

Panel (a) of **Table 5** presents estimation results for the Poisson regression model in which the number of female directors is introduced on the left-hand side of Eq. (1). These models strongly supported Hypothesis 1, just like the probability-of-female-director-appointment model mentioned in Subsection 6.1, by giving a significant and positive coefficient to the variable of board size in all 12 models. Significant estimates of the variable of CEO duality in the panel have signs identical to those in **Table 4** and, hence, indicate that CEO duality in Eastern European public companies has the effect of strongly restricting the number of not only internally appointed but also externally appointed female directors. Panel (a) of **Table 5** also reveals that board independence exerts contrasting effects on the number of female insider directors and the number of female outsider directors, which

correspond well with those reported in **Table 4**. The direction of the effect of ownership structure on the number of female directors is also consistent with that on the probability of appointing female directors. However, there is a slight difference between the estimation results reported in **Table 4** and those in Panel (a) of **Table 5** in terms of the pattern of occurrence of statistically significant estimates of the variable, implying that there may exist a certain difference between the firms' decision as to whether to open their boards to female membership and their decision as to how many women should actually be seated in their boardrooms.

The possibility of a qualitative difference between the managerial decision as to whether to open board positions to women and that as to how many board positions should be reserved for women could be clarified through the estimation of a Heckman two-step model in which the selection bias that may exist between the firms with female directors and those without any female directors is corrected for and the number of female directors in the former group of firms is used as the dependent variable. Panel (b) of **Table 5** shows the results. In this panel, the variable of board size is estimated to be significant and positive in all models, in agreement with those in Panel (a) of the same table. On the other hand, the estimates for the variable of CEO duality derived from the Heckman two-step models differ substantially from the corresponding estimates in Panel (a), in that when observations of Eastern European public companies and Chinese private companies are used for estimation, the statistical significance of the resulting estimates fell below the 10% level, whereas CEO duality in Chinese public companies and Eastern European private companies is found to exert a statistically significant and positive impact on the number of female outsider directors appointed by these firms. The variable of board independence in Panel (b) has the same signs as those in Panel (a), although some difference can be found between them from the viewpoint of statistical significance.

The estimates for the ownership structure variables also tend to be strongly influenced by the control of sample selection bias. Indeed, for Chinese public companies, the variable of ownership concentration and the number of female directors have significant and negative associations regardless of the director type in Panel (a) of **Table 5**, while in Panel (b), their relationship is significant and positive where either all directors or outsider directors are concerned, and positive but insignificant where insider directors are concerned. The dummy variable for firms with foreign owners from developed economies in the models that take the number of female outsider directors in Eastern European private companies on the left-hand side exhibits significant and negative coefficients when sample selection bias is not taken into consideration but shows

significant and positive coefficients in line with Hypothesis 6 when sample selection bias is controlled for. The dummy variable for firms with foreign owners from developing and emerging economies in the models that focused on either all directors or outsider directors in Chinese private companies is given a significant and negative coefficient when sample selection bias is not controlled for, but the statistical significance of the variable is greatly reduced when sample selection bias is treated by the Heckman two-step technique. In Panel (b) of **Table 5**, the inverse Mills ratio, which represents the sample selection bias correction term, is statistically significant in all but one model. This result suggests that there is indeed a qualitative difference between the managerial decision as to whether to appoint women to corporate boards of emerging market firms and that as to how many women the companies should have in their boardrooms, which may have had a significant impact on the empirical assessment of the effect of board composition and ownership structure on the number of female directors.

6.3 Board-gender-diversity model

Table 6 shows the estimation results for the model in which the degree of board gender diversity measured by the *BI* is introduced as the dependent variable. The variable of board size is significant and positive in 11 Tobit models reported in Panel (a) of the table, but its statistical significance is reduced substantially in all but one of the Heckman two-step models shown in Panel (b). The variable of CEO duality is confirmed to have a significant effect on both Chinese firms and Eastern European firms when all sample firms are considered in the empirical analysis. However, when sample selection bias is controlled for and the board gender diversity of only those firms that actually have female directors is considered, CEO duality appears to impact only European private companies, in line with Hypothesis 2. The contrasting effects of board independence on insider directors and outsider directors are repeatedly reproduced in both panels (a) and (b) of **Table 6**, which provides robust empirical support for Hypothesis 3. Compared to the estimates for the board composition variables, those for the ownership structure variables do not seem to be strongly influenced by controlling for sample selection bias, and the implications obtained from these estimates in **Table 6** are by and large consistent with those in **tables 4** and **5**.

6.4 Control variables

Several control variables also show significant estimates in **tables 4** through **6**. In fact, in all models except Model [8] in **Table 5**, the variable of firm size shows a negative sign whenever it is significant at the 10% level or higher. This suggests that the larger the size

of firms in emerging markets, the more reluctant they are to appoint women to their boards, which contradicts empirical findings regarding firms in advanced nations. Meanwhile, the variable of firm age is given a positive sign whenever it is found to have a statistically meaningful effect on board gender diversity, consistent with the empirical results of most previous studies.

Although we expect the profitability variable to be estimated positively, it shows negative coefficients in many models that are subject to Eastern European firms, and therefore we are unable to derive any coherent inference from the estimates of this variable. Although the financial risk variable is estimated to be statistically significant in only a limited number of models, all the significant estimates have a negative sign, which confirms that the empirical finding that, in developed economies, women are less likely to join the board of firms with higher financial risk also applies to China and Eastern European countries to some extent. The solvency variable also exhibits positive coefficients in almost all models in which it is estimated to be significant, which agrees with the findings of studies of firms in advanced nations.

The variable of business diversification repeatedly shows a significant and positive estimate, which confirms that business diversification promotes gender diversity on the boards of Chinese private companies in particular. The innovativeness variable has a negative sign whenever it is estimated to be significant, regardless of which country or region the firms operate in or their listing status. This result implies that the male dominance of the boards of innovative firms is a potent trend not only in developed economies but also in emerging markets.

The estimation results for the control variables are no different from those for the variable of board composition and ownership structure in that they are heavily influenced by controlling for sample selection bias. In other words, we must keep in mind that the statistical significance of the effects of control variables and, in some cases, even the direction of their effects may differ significantly between the managerial decision as to whether to appoint female directors and that concerning the number of female directors or board gender diversity.

6.5 Industry fixed effects

Many preceding works, including Hyland and Marcellino (2002), have emphasized that heterogeneity across industry sectors is one of the key determinants of board gender diversity. This subsection provides an in-depth discussion of this topic.

Appendix Table A1 reports estimates computed for the 13 industry dummy variables using the manufacturing industry as the reference category. The coefficients in the table

describe how different a given industrial sector is, on average, from the manufacturing sector in terms of their effects on board gender diversity. Although the estimates of industry fixed effects vary substantially across panels, generally speaking, we find that firms operating in large and heavy industries like manufacturing tend to have a lower degree of board gender diversity, when other conditions are held constant. On the other hand, the fixed effects of wholesale and retail trade, accommodation and food services, finance and insurance, real estate, professional/scientific/technical services, and administrative and support services are significant and positive in many models, which indicates that firms in these industry sectors adopt more aggressive management policies to promote board gender diversity compared to their counterparts in the manufacturing sector, *ceteris paribus*.

In addition, **Appendix Table A1** shows that many of the industry dummy variables are simultaneously estimated to be statistically significant in the models that target Eastern European private companies, which is evident when compared to the models subject to the other three firm types. This result implies that private companies in Eastern Europe may vary in their openness to female board membership depending on the industry sectors in which they are operating. At the same time, we found that heterogeneity across industrial sectors does not seem to exert as much systematic impact on the board gender diversity of Chinese public/private companies and Eastern European public companies as on that of Eastern European private companies. This finding has important implications in understanding the actual circumstances of emerging market firms.

7 Conclusions

In this paper, to clarify the current state and determinants of board gender diversity in emerging market firms, we conducted an empirical analysis using data on 42,094 public/private companies operating in China and 21 Eastern European countries. The important findings and implications obtained from its results can be summarized in the following four points:

First, in China and Eastern European countries that used to implement policies to advance gender egalitarianism as part of the socialist ideology and encouraged female labor force participation, internal promotion constitutes important appointment routes that are used as often as—or even more often than—external promotion to recruit women to director positions in a firm. This sets these countries apart from other nations that

primarily recruit female directors from outside the firm. This is why it is important to give due consideration to the differences in female director appointment routes when investigating board gender diversity in emerging market firms that transitioned from a planned system to a market economy.

Second, when we look at the prevalence of firms recruiting at least one female board member, even private companies in emerging markets do not lag far behind the standards of the international community, and the public companies in these regions fare much better than firms in some developed economies, such as Japan and Italy. Therefore, the organizational framework of emerging market firms deserves more intensive evaluation from the perspective of gender diversity. However, it is also a fact that the majority of Chinese and Eastern European firms opening their boards to female membership only grant one or two board seats to women; as a result, very few firms have achieved or are on the path to achieving gender equality in their boardrooms.

Third, the major factors that define board composition, including board size, CEO duality, and board independence, which constitute important determinants of board gender diversity in emerging market firms, are confirmed to affect board gender diversity in manners consistent with our predictions. Ownership structure, characterized by ownership concentration and the presence of state and foreign entities investing in the firm, has an effect comparable to that of board composition on board gender diversity. However, the direction and statistical significance of its effect seem to vary substantially depending on the location and listing status of the firms and did not provide empirical support for our predictions as strong as that of board composition. Firm size and age, financial performance, the degree of business diversification, innovativeness, and heterogeneity across industrial sectors were also found to strongly impact board gender diversity in emerging market firms, as emphasized by many previous research works. Although the effects of these factors on board gender diversity are largely similar between firms in emerging markets and developed economies, our empirical results concerning the effects of firm size and profitability on board gender diversity are by no means consistent with those reported by studies of advanced nations.

The fourth and final point we would like to stress is the substantial qualitative difference that exists between the stages of managerial decisions concerning gender diversity on the boards of emerging market firms (i.e., a decision as to whether to open their boards to women in the first place and a more practical decision as to how many board positions should be reserved for women), which must be carefully taken into consideration during empirical analysis. The estimation results reported in the previous

section strongly suggest that the statistical significance of the independent variables can change substantially; in some cases, even the direction of their effects can be reversed, depending on whether the results are controlling for the selection bias that may exist between firms with and without female directors. As is the case with the majority of previous studies, the hypotheses we formulated in this paper do not sufficiently account for the differences between the aforementioned decision-making stages, and we are aware of the need for further theoretical discussion on this issue and thorough consideration of this difference during empirical analysis.

By adopting an empirical approach to examining firms operating in China and a wide range of countries in Eastern Europe, this paper has made a certain contribution to clarifying the internal organization of emerging market firms from the perspective of board gender diversity. It has also identified several research topics that need to be addressed. Research on the gender issues of firms in emerging markets is still in its infancy, and we hope our work will inspire future research in this area.

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Table 1. Composition of sample firms by number of employees and industry

	Number of sample firms				Proportion (%)			
	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies
Composition by number of employees								
Firms with fewer than 100 employees	1,963	350	551	9,029	18.6	17.8	14.7	35.0
Firms with 100 to 499 employees	4,513	800	1,844	12,591	42.7	40.7	49.1	48.8
Firms with 500 to 999 employees	1,143	309	554	2,319	10.8	15.7	14.7	9.0
Firms with 1000 or more employees	2,952	508	808	1,860	27.9	25.8	21.5	7.2
Composition by industry								
Agriculture, forestry, and fishing	189	60	32	1,497	1.8	3.1	0.9	5.8
Mining and quarrying	111	67	13	341	1.1	3.4	0.3	1.3
Manufacturing	5,840	902	2,672	9,859	55.2	45.9	71.1	38.2
Electricity, gas, steam, and air conditioning supply	147	117	38	776	1.4	5.9	1.0	3.0
Water supply, sewerage, waste management, and remediation activities	132	26	5	824	1.2	1.3	0.1	3.2
Construction	137	120	60	1,797	1.3	6.1	1.6	7.0
Wholesale and retail trade, repair of motor vehicles and motorcycles	1,311	164	470	3,664	12.4	8.3	12.5	14.2
Transportation and storage	184	108	83	1,769	1.7	5.5	2.2	6.9
Accommodation and food service activities	42	70	14	612	0.4	3.6	0.4	2.4
Information and communication	1,239	58	132	1,049	11.7	2.9	3.5	4.1
Financial and insurance activities	125	150	126	706	1.2	7.6	3.4	2.7
Real estate activities	129	29	21	565	1.2	1.5	0.6	2.2
Professional, scientific, and technical activities	698	62	50	1,572	6.6	3.2	1.3	6.1
Administrative and support service activities	287	34	41	768	2.7	1.7	1.1	3.0
Total	10,571	1,967	3,757	25,799	100.0	100.0	100.0	100.0

Source: Authors' calculation based on the Orbis database

Table 2. Name, definition, and descriptive statistics of variables used in empirical analysis

Variable name	Definition	Chinese public companies			European public companies			Chinese private companies			European private companies		
		Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.
Dependent variables [a]													
Firm with a female director(s)	Probability of having a female director(s) in the boardroom	0.576	1	0.494	0.829	1	0.376	0.348	0	0.477	0.672	1	0.470
Firm with an insider female director(s)	Probability of having a female insider director(s) in the boardroom	0.486	0	0.500	0.550	1	0.498	0.283	0	0.450	0.452	0	0.498
Firm with an outsider/independent female director(s)	Probability of having a female outsider/independent director(s) in the boardroom	0.392	0	0.488	0.717	1	0.451	0.139	0	0.346	0.340	0	0.474
Number of female directors	Number of female directors in the boardroom	1.594	1	2.354	4.405	3	5.169	0.621	0	2.226	1.991	1	2.685
Number of insider female directors	Number of female insider directors in the boardroom	0.886	0	1.238	1.262	1	1.755	0.356	0	0.665	0.802	0	1.280
Number of outsider female directors	Number of female outsider directors in the boardroom	0.708	0	1.740	3.143	1	4.867	0.265	0	2.055	1.189	0	2.516
Blau index of gender diversity in the boardroom	Blau index of gender diversity in the boardroom	0.210	0.219	0.198	0.276	0.298	0.164	0.148	0.000	0.184	0.265	0.337	0.200
Blau index of gender diversity in insider directorship	Blau index of gender diversity among insider directors in the boardroom	0.187	0.000	0.210	0.204	0.180	0.209	0.105	0.000	0.187	0.202	0.000	0.216
Blau index of gender diversity in outsider directorship	Blau index of gender diversity among outsider directors in the boardroom	0.149	0.000	0.207	0.168	0.153	0.177	0.027	0.000	0.109	0.109	0.000	0.178
Independent variables [b]													
Board size	Total number of board directors	9.181	7.000	7.571	15.492	13.000	10.616	5.009	4.000	4.739	5.799	4.000	4.471
CEO duality	Dummy for companies in which CEO holds the position of board chairperson concurrently	0.097	0	0.296	0.086	0	0.280	0.360	0	0.480	0.758	1	0.429
Board independence	Proportion of outsider/indepenent directors to total number of board directors	46.321	44.444	13.853	64.587	69.231	21.362	43.988	40.000	18.356	40.409	33.333	40.613
Ownership concentration	Average ownership share per shareholder/member	0.223	0.100	0.288	0.298	0.200	0.268	0.525	0.500	0.345	0.635	0.500	0.336
State ownership	Dummy for firms with state as the ultimate owner at the 50% control threshold	0.025	0	0.155	0.093	0	0.290	0.064	0	0.244	0.095	0	0.294
Foreign ownership in advanced economies	Dummy for firms with a foreign investor from advanced economies as the ultimate owner at the 50% control threshold	0.005	0	0.067	0.077	0	0.267	0.120	0	0.324	0.206	0	0.404
Foreign ownership in developing/emerging economies	Dummy for firms with a foreign investor from developing/emerging economiesas the ultimate owner at the 50% control threshold	0.001	0	0.034	0.070	0	0.255	0.039	0	0.195	0.049	0	0.215
Firm size	Natural logarithm of total number of employees	6.038	5.659	1.589	6.049	5.905	1.425	5.868	5.704	1.379	5.171	5.011	1.068
Firm age	Years in operation	17.200	17.000	6.379	51.324	34.000	38.200	15.850	16.000	7.350	25.712	24.000	18.755
Profitability	3-year average of profit margin	9.607	8.667	13.151	4.461	3.350	14.909	6.393	4.040	12.654	4.923	3.853	11.492
Financial risk	3-year standard deviation of ROA	14.288	2.519	971.756	10.478	2.013	222.528	4.007	2.325	9.144	10.540	2.745	724.773
Solvency	3-year average of solvency ratio	57.019	57.923	19.562	49.511	52.290	29.472	42.830	42.907	24.374	47.522	48.860	28.255
Business diversification [c]	Number of operating industries	1.230	1	0.678	1.709	1	1.975	1.054	1	0.454	4.672	2	5.761
Innovativeness [d]	Natural logarithm of total number of granted patents plus one	0.804	0	1.710	0.321	0	0.876	0.471	0	1.329	0.097	0	0.473

Notes:

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

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

[c] According to the NACE Rev. 2 secondary codes

[d] According to Moody's Analytics, the information source of patent data is the PATSTAT database, established and maintained by the European Patent Office. Although the PATSTAT is a worldwide database containing bibliographical data on the majority of patents currently in force, it aggregates many different sources with various coding policies and hence may not always allow for the inclusion of all patents.

Source: Authors' calculation based on the Orbis database

Figure 1. Composition of female directors in 42,094 emerging market firms by firm type and job classification

(a) Chinese public companies, 10,571 firms, 16,289 female directors
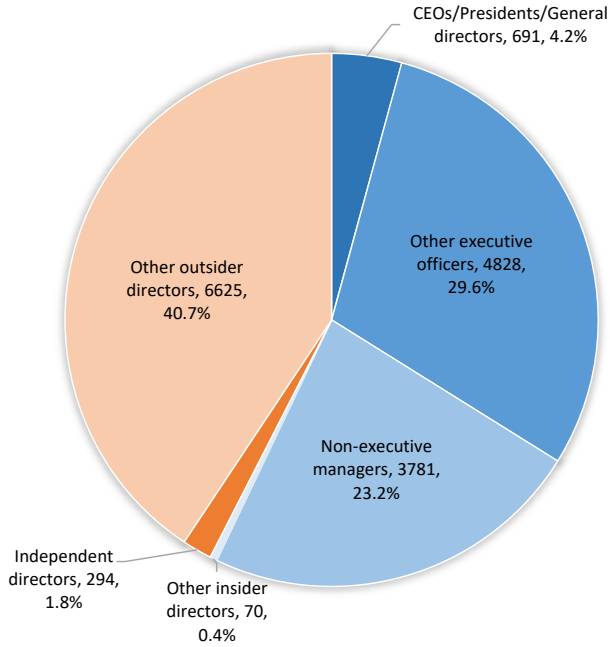
(b) European public companies, 1,967 firms, 6,151 female directors
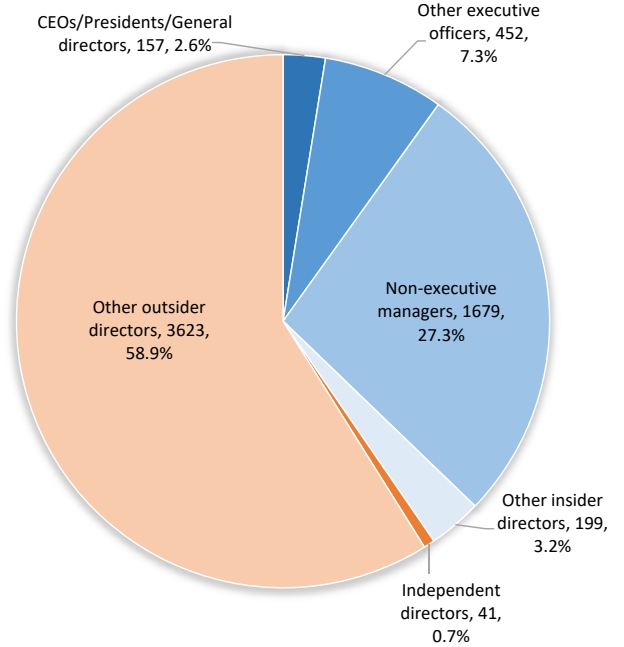
(c) Chinese private companies, 3,757 firms, 2,139 female directors
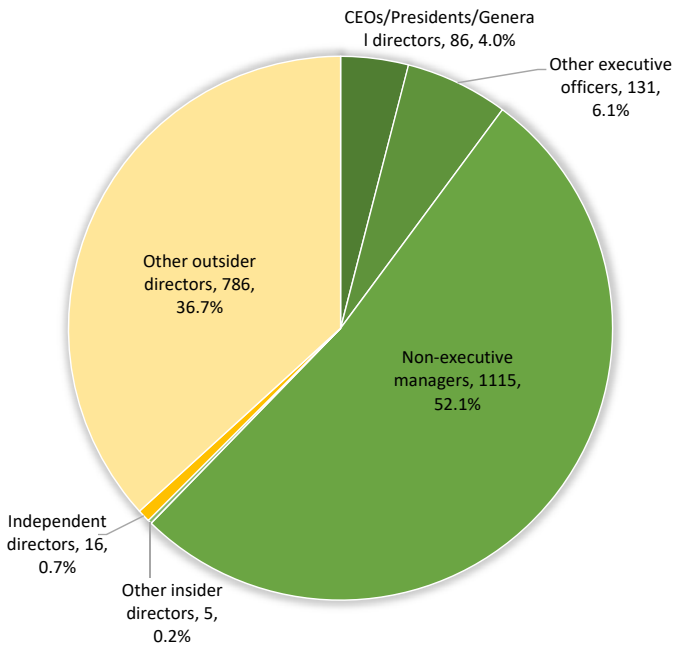
(d) European private companies, 25,799 firms, 36,911 female directors
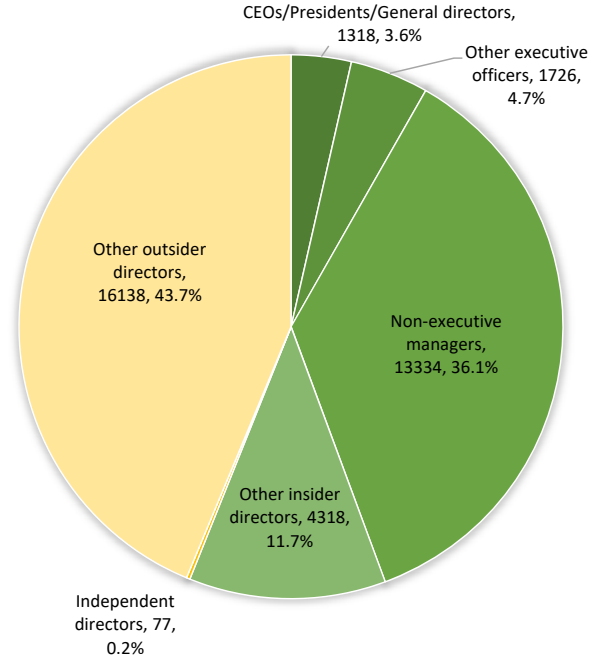
Note: Figures represent the total number of directors in each individual category and its percentage of all female directors.

Source: Authors' illustrations based on the Orbis database

Figure 2. Number of female directors per company and per 1,000 employees by firm type and industry

(a) Per company

■ Chinese public companies   ■ European public companies   ■ Chinese private companies   ■ European private companies

(b) Per 1,000 employees
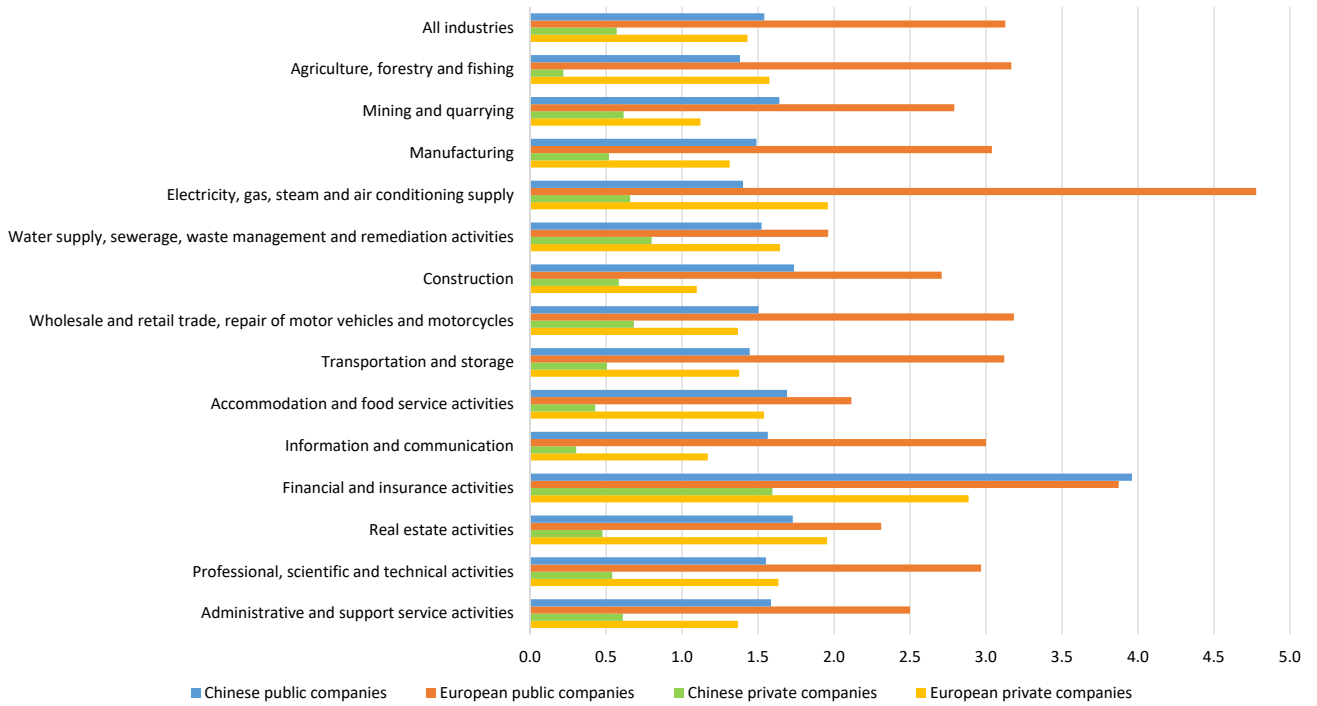
■ Chinese public companies   ■ European public companies   ■ Chinese private companies   ■ European private companies
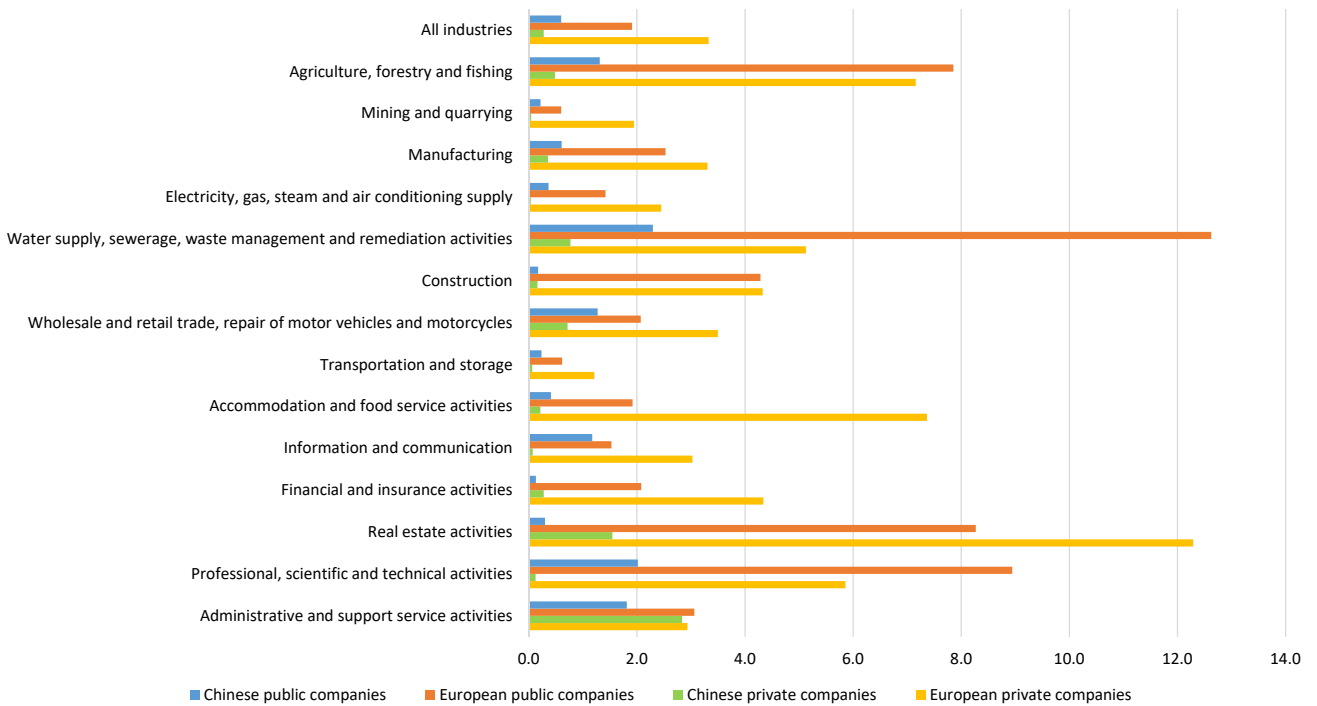
Source: Authors' illustration based on the Orbis database

Table 3. Probability of having a female director(s) in the boardroom by director type and firm type

	Female directors				Female insider directors				Female outsider/independent directors			
	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies
(a) Number of companies												
Firms with no director concerned	4,487	336	2,448	8,473	5,432	885	2,695	14,143	6,429	557	3,234	17,019
Firms with a director(s) concerned	6,084	1,631	1,309	17,326	5,139	1,082	1,062	11,656	4,142	1,410	523	8,780
(b) Proportion (%)												
Firms with no director concerned	42.4	17.1	65.2	32.8	51.4	45.0	71.7	54.8	60.8	28.3	86.1	66.0
Firms with a director(s) concerned	57.6	82.9	34.8	67.2	48.6	55.0	28.3	45.2	39.2	71.7	13.9	34.0

Source: Authors' calculation based on the Orbis database

Figure 3. Number of female directors in the boardroom by director type and firm type

(a) Female directors

(b) Female insider directors

(c) Female outsider/independent directors

Note: The horizontal axis is the number of female directors. The vertical axis is the proportion of sample firms to the total number of companies with a female director(s) (%).
Source: Authors' illustration based on the Orbis database

Figure 4. Gender diversity in the boardroom by director type and firm type

(a) All board members

Chinese public companies ■ European public companies ■ Chinese private companies ■ European private companies

(b) Insider directors

Chinese public companies ■ European public companies ■ Chinese private companies ■ European private companies

(c) Outsider/independent directors

Chinese public companies ■ European public companies ■ Chinese private companies ■ European private companies
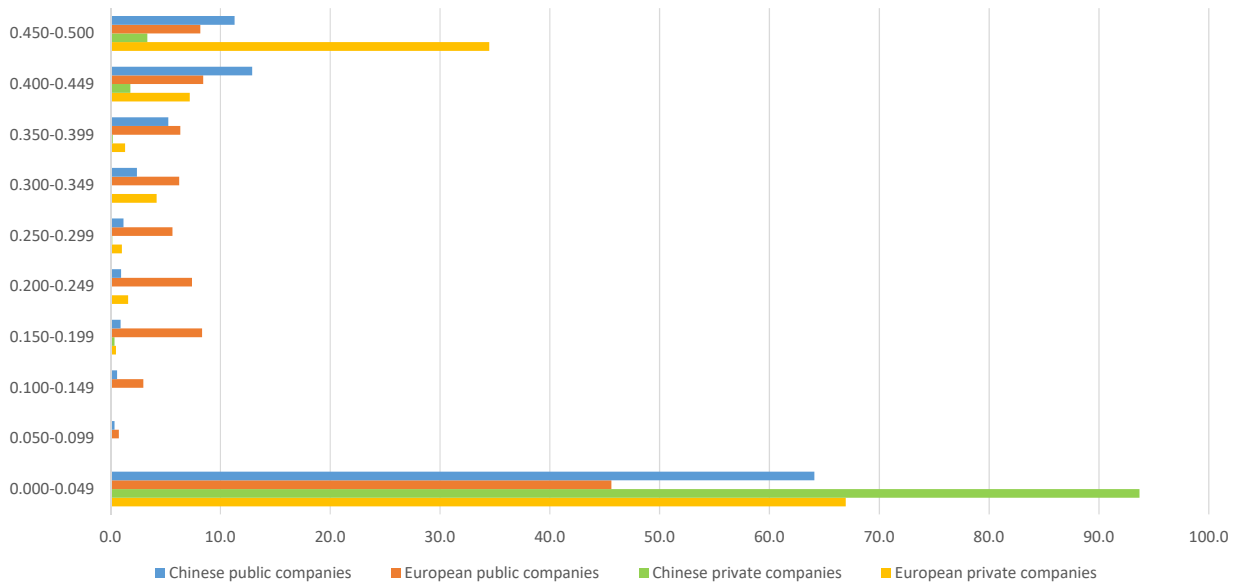
Note: The horizontal axis is the proportion of sample firms to the total number of companies (%). The vertical axis is Blau index.
Source: Authors' illustration based on the Orbis database

Table 4. Determinants of appointment of women to the boardroom

Estimator	Probit											
Dependent variable	Firm with a female director(s)				Firm with an insider female director(s)				Firm with an outsider/independent female director(s)			
Firm type	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies
Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Board composition												
Board size	0.06751 ***	0.05009 ***	0.06878 ***	0.30558 ***	0.04714 ***	0.04581 ***	0.04170 ***	0.28433 ***	0.03643 ***	0.05438 ***	0.06064 ***	0.16527 ***
	(0.0043)	(0.0077)	(0.0127)	(0.0121)	(0.0028)	(0.0070)	(0.0079)	(0.0116)	(0.0024)	(0.0065)	(0.0097)	(0.0081)
CEO duality	0.09166 *	-0.23953 *	-0.23468 ***	-0.10581 *	0.04826	-0.38834 ***	-0.29561 ***	-0.38923 ***	0.13609 ***	-0.13124	0.23107 **	-0.12894 **
	(0.0477)	(0.1435)	(0.0913)	(0.0575)	(0.0470)	(0.1432)	(0.0891)	(0.0586)	(0.0474)	(0.1368)	(0.1013)	(0.0579)
Board independence	-0.00517 ***	0.00320	-0.01334 ***	-0.00180 ***	-0.01694 ***	-0.02139 ***	-0.02702 ***	-0.03889 ***	0.01330 ***	0.02261 ***	0.01121 ***	0.05341 ***
	(0.0011)	(0.0026)	(0.0025)	(0.0006)	(0.0010)	(0.0023)	(0.0025)	(0.0007)	(0.0010)	(0.0023)	(0.0024)	(0.0009)
Ownership structure												
Ownership concentration	-0.18504 ***	0.37046 **	-0.11816	0.11286 **	-0.26378 ***	0.17380	-0.03081	-0.07837	-0.05139	0.24955 *	-0.01162	0.08370
	(0.0504)	(0.1661)	(0.0947)	(0.0503)	(0.0508)	(0.1459)	(0.0994)	(0.0532)	(0.0504)	(0.1495)	(0.1133)	(0.0652)
State ownership	-0.09398	0.16447	-0.09558	-0.19151 ***	-0.27718 ***	0.06870	-0.40455 **	-0.13695 **	0.09592	0.23628	0.12336	-0.00009
	(0.1014)	(0.1908)	(0.1526)	(0.0699)	(0.0982)	(0.1574)	(0.1623)	(0.0671)	(0.0919)	(0.1642)	(0.1702)	(0.0706)
Foreign ownership in advanced economies	-0.08714	-0.32704 **	-0.11932	-0.25215 ***	-0.22466	-0.16132	-0.19598 **	-0.14991 ***	0.05729	-0.43318 ***	-0.04238	-0.21459 ***
	(0.2017)	(0.1461)	(0.0917)	(0.0403)	(0.2001)	(0.1320)	(0.0993)	(0.0455)	(0.1955)	(0.1389)	(0.1096)	(0.0602)
Foreign ownership in developing/emerging economies	-0.33486	0.01428	0.18441	-0.36252 ***	-0.55791	-0.11065	0.23762	-0.20654 **	0.09311	-0.00618	0.11384	-0.26494 ***
	(0.3710)	(0.1647)	(0.1451)	(0.0710)	(0.3920)	(0.1415)	(0.1529)	(0.0811)	(0.3517)	(0.1519)	(0.1771)	(0.0951)
Firm size and age												
Firm size	-0.06958 ***	-0.00265	-0.03916	-0.08060 ***	-0.06170 ***	-0.03385	-0.01369	-0.07233 ***	-0.07067 ***	-0.03373	-0.05321 *	-0.06456 ***
	(0.0116)	(0.0398)	(0.0264)	(0.0169)	(0.0116)	(0.0346)	(0.0276)	(0.0182)	(0.0115)	(0.0365)	(0.0300)	(0.0216)
Firm age	0.00676 ***	0.00212 *	0.00300	0.00369 ***	0.00511 **	0.00217 **	0.00612	0.00455 ***	0.00370	0.00139	0.00096	0.00298 **
	(0.0024)	(0.0012)	(0.0051)	(0.0010)	(0.0026)	(0.0010)	(0.0054)	(0.0009)	(0.0024)	(0.0010)	(0.0059)	(0.0012)
Financial peformance and business activity												
Profitability	0.00104	-0.00008	0.00127	-0.00402 **	0.00019	-0.00333	-0.00409	-0.00388 **	0.00106	-0.00242	0.00398	-0.00448 **
	(0.0011)	(0.0031)	(0.0032)	(0.0017)	(0.0011)	(0.0028)	(0.0032)	(0.0016)	(0.0011)	(0.0027)	(0.0036)	(0.0019)
Financial risk	-0.00441	-0.00138	-0.00975	-0.00159	-0.00397	-0.00059	-0.01100	-0.00203	-0.00199	-0.00385	-0.00501	-0.00896 **
	(0.0029)	(0.0053)	(0.0069)	(0.0022)	(0.0029)	(0.0055)	(0.0082)	(0.0024)	(0.0029)	(0.0058)	(0.0053)	(0.0035)
Solvency	0.00082	0.00128	0.00155	0.00331 ***	0.00107	-0.00149	0.00325 **	0.00300 ***	0.00062	0.00296 **	0.00055	0.00252 ***
	(0.0008)	(0.0016)	(0.0015)	(0.0006)	(0.0008)	(0.0014)	(0.0016)	(0.0006)	(0.0008)	(0.0015)	(0.0018)	(0.0007)
Business diversification	0.01049	0.01380	0.36339 ***	0.00719	0.01706	-0.01552	0.18015 *	-0.00088	-0.00516	0.03028	0.25646 **	0.00557
	(0.0224)	(0.0230)	(0.1175)	(0.0051)	(0.0214)	(0.0194)	(0.1065)	(0.0056)	(0.0212)	(0.0206)	(0.1092)	(0.0061)
Innovativeness	-0.01396	-0.13569 ***	-0.02593	-0.11859 ***	-0.01619 *	-0.03525	-0.03220	-0.12133 ***	-0.00720	-0.16698 ***	-0.00076	-0.10548 **
	(0.0093)	(0.0518)	(0.0232)	(0.0352)	(0.0091)	(0.0480)	(0.0232)	(0.0384)	(0.0089)	(0.0463)	(0.0268)	(0.0424)
Const.	0.14060	0.30524	0.16004	-0.03570	0.61763 ***	1.60440 ***	0.37422	0.82328 ***	-0.92368 ***	-1.39525 ***	-1.68227 ***	-3.77297 ***
	(0.1076)	(0.3288)	(0.2459)	(0.1444)	(0.1027)	(0.3046)	(0.2458)	(0.1488)	(0.1013)	(0.3037)	(0.2601)	(0.1682)
Industriy fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670
Log pseudolikelihood	-6340.36	-653.42	-1055.12	-12326.51	-6399.98	-860.18	-925.28	-10909.22	-6386.37	-799.48	-695.38	-8226.59
Pseudo R^2	0.0612	0.1379	0.0882	0.1357	0.0673	0.2493	0.1229	0.3002	0.0370	0.1868	0.0780	0.4405
Wald test (χ^2)	448.57 ***	182.26 ***	144.03 ***	2376.25 ***	749.00 ***	388.17 ***	227.06 ***	4579.97 ***	415.21 ***	287.44 ***	90.50 ***	6987.64 ***

Note: Table 2 provides detailed definitions and descriptive statistics of the variables used in estimation. Panel (a) of Appendix Table A1 reports estimates of industry fixed effects. Standard errors are computed using the Huber–White sandwich estimator and reported in parentheses beneath the corresponding coefficients. The Wald test examines the null hypothesis that all regression coefficients are zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimations

Table 5. Determinants of number of female directors in the boardroom

(a) All companies

		Number of female directors			Number of insider female directors			Number of outsider/independent female directors			
Estimator	Poisson											
Dependent variable		Number of female directors				Number of insider female directors				Number of outsider/independent female directors		
Firm type	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies
Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Board composition												
Board size	0.04660*** (0.0023)	0.02767*** (0.0024)	0.05962*** (0.0046)	0.04485*** (0.0031)	0.04548*** (0.0020)	0.02958*** (0.0020)	0.05497*** (0.0051)	0.04229*** (0.0034)	0.04317*** (0.0025)	0.02980*** (0.0030)	0.31688** (0.1329)	0.05477*** (0.0036)
CEO duality	0.00778 (0.0526)	-0.20055** (0.0977)	-0.08525 (0.1127)	-0.12723*** (0.0236)	-0.14615*** (0.0425)	-0.33953*** (0.1179)	-0.36735*** (0.0956)	-0.32638*** (0.0418)	0.11808 (0.0989)	-0.25409** (0.1251)	0.94043** (0.3967)	-0.08652*** (0.0249)
Board independence	0.00078 (0.0015)	0.01942*** (0.0018)	-0.00463 (0.0042)	0.00985*** (0.0003)	-0.02576*** (0.0010)	-0.02122*** (0.0015)	-0.03732*** (0.0028)	-0.02020*** (0.0003)	0.03147*** (0.0022)	0.04421*** (0.0025)	0.03548*** (0.0133)	0.04419*** (0.0008)
Ownership structure												
Ownership concentration	-0.25619*** (0.0505)	0.00335 (0.1026)	-0.03369 (0.1212)	0.09849*** (0.0239)	-0.28410*** (0.0536)	-0.09874 (0.1146)	0.07185 (0.1149)	-0.10089*** (0.0288)	-0.20216*** (0.0656)	0.01928 (0.1203)	-0.01840 (0.1387)	0.06737** (0.0326)
State ownership	-0.36161*** (0.1061)	0.07370 (0.0914)	0.07150 (0.1795)	-0.03230 (0.0273)	-0.34583*** (0.1056)	-0.13473 (0.0905)	-0.43452** (0.2109)	0.05010 (0.0411)	-0.36511*** (0.1360)	0.15013 (0.1123)	0.18688 (0.5433)	0.00288 (0.0326)
Foreign ownership in advanced economies	-0.27454* (0.1608)	-0.02572 (0.1144)	-0.16864 (0.1058)	-0.16919*** (0.0268)	-0.30875 (0.1998)	0.00462 (0.1238)	-0.11799 (0.1292)	-0.10041*** (0.0282)	-0.31041 (0.2164)	-0.06827 (0.1310)	-0.12680 (0.1327)	-0.18375*** (0.0426)
Foreign ownership in developing/emerging economies	-0.23373 (0.3613)	-0.07861 (0.0999)	0.02399 (0.1560)	-0.15367*** (0.0367)	-0.54620 (0.5449)	-0.04307 (0.1062)	0.06241 (0.1569)	-0.04502 (0.0397)	0.07977 (0.3901)	-0.11012 (0.1363)	0.14157 (0.1594)	-0.21042*** (0.0548)
Firm size and age												
Firm size	-0.05082*** (0.0149)	-0.00379 (0.0231)	-0.02414 (0.0350)	0.00486 (0.0131)	-0.04371*** (0.0120)	-0.03715 (0.0234)	-0.00742 (0.0326)	0.05039*** (0.0147)	-0.05777*** (0.0221)	-0.00283 (0.0270)	-0.13592** (0.0655)	-0.00398 (0.0165)
Firm age	0.00239 (0.0023)	0.00097 (0.0006)	-0.00059 (0.0069)	0.00247*** (0.0004)	0.00270 (0.0025)	0.00086 (0.0006)	0.00511 (0.0056)	0.00316*** (0.0005)	0.00390 (0.0030)	0.00085 (0.0007)	-0.00915 (0.0131)	0.00327*** (0.0005)
Financial performance and business activity												
Profitability	0.00195* (0.0011)	-0.00302* (0.0017)	0.00859 (0.0068)	-0.00114* (0.0007)	0.00031 (0.0010)	-0.00173 (0.0019)	-0.00257 (0.0035)	-0.00160* (0.0008)	0.00366** (0.0015)	-0.00356* (0.0020)	0.00169 (0.0078)	-0.00099 (0.0009)
Financial risk	-0.00467 (0.0029)	-0.00590 (0.0039)	-0.00248 (0.0041)	-0.00514*** (0.0014)	-0.00494* (0.0030)	-0.00524 (0.0047)	-0.01682 (0.0118)	-0.00253* (0.0014)	-0.00339 (0.0038)	-0.00776 (0.0056)	0.00180 (0.0048)	-0.00744*** (0.0019)
Solvency	0.00184** (0.0008)	0.00122 (0.0010)	0.00243 (0.0017)	0.00104*** (0.0003)	0.00167*** (0.0007)	-0.00126 (0.0010)	0.00195 (0.0018)	0.00084** (0.0004)	0.00206 (0.0013)	0.00253** (0.0012)	0.00281 (0.0023)	0.00110*** (0.0004)
Business diversification	0.00757 (0.0251)	0.00560 (0.0129)	0.05874 (0.1922)	0.00399 (0.0025)	0.02253 (0.0198)	-0.03113** (0.0143)	0.21701** (0.0979)	0.00095 (0.0028)	-0.00919 (0.0400)	0.01541 (0.0151)	-0.24831 (0.6102)	0.00505 (0.0036)
Innovativeness	-0.01231 (0.0103)	-0.04419 (0.0468)	0.02515 (0.0308)	-0.08360*** (0.0229)	-0.00654 (0.0087)	-0.04965 (0.0317)	-0.00143 (0.0283)	-0.04142* (0.0231)	-0.01286 (0.0162)	-0.02909 (0.0647)	-0.02667 (0.0799)	-0.11240*** (0.0372)
Const.	0.12882 (0.1285)	-0.23201 (0.2270)	-0.68416* (0.3466)	-0.04708 (0.0780)	0.73948*** (0.0967)	1.67613*** (0.2181)	0.13663 (0.2739)	0.43786*** (0.0854)	-2.23336*** (0.2044)	-2.61313*** (0.2946)	-2.28065** (0.9815)	-3.06753*** (0.1113)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670
Log likelihood	-18002.41	-4901.25	-1850.81	-42459.53	-12126.17	-2157.14	-1212.83	-22989.32	-11065.04	-4061.27	-8727.95	-26178.69
Pseudo R²	0.1058	0.2181	0.3342	0.1878	0.1062	0.2652	0.1463	0.2432	0.1542	0.3247	0.1839	0.4556
Wald test (χ^2)	830.46***	745.47***	1435.77***	7111.06***	1655.01***	1343.45***	1227.86***	8993.35***	839.94***	1264.90***	3030.92***	9876.39***

(b) Companies with a female director(s) with control for sample selection

		Number of female directors				Number of insider female directors				Number of outsider/independent female directors		
Estimator	Heckman two-step											
Dependent variable		Number of female directors				Number of insider female directors				Number of outsider/independent female directors		
Firm type	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies
Model	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
Board composition												
Board size	0.10490*** (0.0118)	0.14296*** (0.0264)	0.77967*** (0.1804)	0.17991*** (0.0077)	0.04989*** (0.0058)	0.06298*** (0.0059)	0.08145*** (0.0177)	0.14187*** (0.0027)	0.05501*** (0.0099)	0.07998*** (0.0221)	0.69822*** (0.1627)	0.03804*** (0.0070)
CEO duality	0.25883** (0.1065)	0.61198 (0.7143)	-1.98303 (1.8128)	0.17092*** (0.0655)	-0.18315*** (0.0531)	-0.12399 (0.1617)	-0.28693 (0.1779)	-0.09998** (0.0245)	0.44198*** (0.0892)	0.73597 (0.5974)	-1.69610 (1.6348)	0.27090*** (0.0597)
Board independence	0.02563*** (0.0029)	0.09664*** (0.0104)	-0.12347* (0.0755)	0.02361*** (0.0008)	-0.02878*** (0.0014)	-0.03169*** (0.0023)	-0.03231*** (0.0074)	-0.02163*** (0.0003)	0.05441*** (0.0024)	0.12833*** (0.0087)	-0.09116 (0.0681)	0.04525*** (0.0007)
Ownership structure												
Ownership concentration	0.29712** (0.1445)	-0.89165 (1.5672)	-1.42970 (1.5672)	0.29195*** (0.0646)	0.03027 (0.0723)	-0.23321 (0.1663)	-0.01243 (0.1538)	0.06513*** (0.0248)	0.26684** (0.1212)	-0.65845 (0.6221)	-1.41727 (1.4134)	0.22681*** (0.0588)
State ownership	-1.02638*** (0.1993)	0.39208 (0.6349)	-0.29838 (2.2641)	-0.22713*** (0.0777)	-0.44549*** (0.0991)	-0.16397 (0.1406)	-0.40139* (0.2222)	-0.08301*** (0.0290)	-0.58089*** (0.1668)	0.55605 (0.5310)	0.10301 (2.0419)	-0.14412** (0.0707)
Foreign ownership in advanced economies	-0.54640 (0.4675)	0.71817 (0.6892)	-1.79967 (1.5470)	0.05707 (0.0588)	-0.29391 (0.2339)	-0.02485 (0.1553)	-0.22151 (0.1519)	-0.05969** (0.0231)	-0.25249 (0.3922)	0.74301 (0.5764)	-1.57817 (1.3951)	0.11676** (0.0535)
Foreign ownership in developing/emerging economies	-0.20616 (0.9945)	-0.42129 (0.7010)	1.74682 (2.3599)	0.03318 (0.1010)	-0.28378 (0.5002)	-0.07244 (0.1571)	0.08194 (0.2316)	0.01655 (0.0393)	0.07762 (0.8361)	-0.34884 (0.5862)	1.66488 (2.1282)	0.01663 (0.0920)
Firm size and age												
Firm size	-0.04531 (0.0309)	-0.35065** (0.1613)	-0.48250 (0.4451)	-0.07781*** (0.0215)	-0.01308 (0.0153)	-0.13828*** (0.0361)	-0.02144 (0.0437)	-0.01281 (0.0082)	-0.03223 (0.0258)	-0.21237 (0.1349)	-0.46106 (0.4014)	-0.06500*** (0.0196)
Firm age	-0.00642 (0.0054)	0.00075 (0.0049)	0.03156 (0.0807)	-0.00143 (0.0011)	0.00028 (0.0027)	0.00029 (0.0011)	0.00681 (0.0079)	0.00029 (0.0004)	-0.00669 (0.0045)	0.00046 (0.0041)	0.02475 (0.0728)	-0.00172* (0.0010)
Financial performance and business activity												
Profitability	0.00289 (0.0026)	-0.01190 (0.0128)	0.01627 (0.0535)	0.00355* (0.0019)	-0.00145 (0.0013)	-0.00158 (0.0029)	0.00147 (0.0052)	-0.00206*** (0.0007)	0.00435** (0.0022)	-0.01032 (0.0107)	0.01481 (0.0482)	0.00561*** (0.0018)
Financial risk	0.00176 (0.0068)	-0.00501 (0.0254)	-0.05755 (0.1240)	-0.00281 (0.0031)	-0.00133 (0.0034)	-0.00261 (0.0057)	-0.01713 (0.0122)	0.00145 (0.0012)	0.00309 (0.0057)	-0.00240 (0.0212)	-0.04042 (0.1119)	-0.00427 (0.0028)
Solvency	0.00059 (0.0018)	0.00288 (0.0068)	0.02391 (0.0250)	-0.00137* (0.0008)	0.00157* (0.0009)	-0.00224 (0.0015)	0.00164 (0.0025)	0.00061** (0.0003)	-0.00098 (0.0015)	0.00512 (0.0057)	0.02227 (0.0225)	-0.00198*** (0.0007)
Business diversification	0.07763* (0.0459)	-0.02033 (0.0938)	1.80561 (1.6422)	-0.00792 (0.0066)	0.03132 (0.0228)	-0.05833*** (0.0210)	0.25205 (0.1612)	-0.00138 (0.0026)	0.04630 (0.0384)	0.03801 (0.0784)	1.55357 (1.4810)	-0.00654 (0.0060)
Innovativeness	-0.04021** (0.0201)	0.01597 (0.2213)	-0.21546 (0.3805)	-0.13685*** (0.0432)	-0.00922 (0.0373)	-0.05364 (0.0495)	-0.01307 (0.0373)	-0.06569*** (0.0169)	-0.03099* (0.0169)	0.06962 (0.1851)	-0.20239 (0.3431)	-0.07115* (0.0394)
Const.	1.49193*** (0.3425)	0.09988 (1.7777)	-10.67911** (5.0452)	1.60782*** (0.1918)	2.58227*** (0.1700)	4.40051*** (0.3976)	0.37458 (0.4953)	1.41753*** (0.0723)	-1.09034*** (0.2863)	-4.30062*** (1.4867)	-11.05368** (4.5500)	0.19029 (0.1746)
Inverse Mill's ratio	-1.11507** (0.4585)	-6.45009*** (2.1805)	15.79143** (6.4198)	-2.76052*** (0.1938)	-0.32212 (0.2270)	-1.05578** (0.4966)	1.55012** (0.6302)	-0.24661*** (0.0735)	-0.79295** (0.3829)	-5.39431*** (1.8235)	14.24130** (5.7896)	-2.51392*** (0.1765)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670
Wald test (χ^2)	558.80***	210.19***	32.45	5085.83***	568.56***	828.52***	44.42**	15148.68***	1299.46***	431.52***	35.82	11364.62***

Note: Panel (b) displays the second-stage estimation results. Table 2 provides detailed definitions and descriptive statistics of the variables used in estimation. Panels (b) and (c) of Appendix Table A1 report estimates of industry fixed effects. Standard errors are computed using the Huber–White sandwich estimator and reported in parentheses beneath the corresponding coefficients. The Wald test examines the null hypothesis that all regression coefficients are zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimations

Table 6. Determinants of gender diversity in the boardroom

(a) All companies

Estimator	Tobit											
Dependent variable	Blau index of gender diversity in the boardroom				Blau index of gender diversity of insider directorship				Blau index of gender diversity of outsider directorship			
Firm type	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies
Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Board composition												
Board size	0.00608 ***	0.00023	0.00846 ***	0.00792 ***	0.01023 ***	0.00500 ***	0.02958 ***	0.01938 ***	0.00962 ***	0.00382 ***	0.03716 ***	0.01326 ***
	(0.0004)	(0.0004)	(0.0012)	(0.0007)	(0.0007)	(0.0010)	(0.0033)	(0.0017)	(0.0008)	(0.0007)	(0.0093)	(0.0014)
CEO duality	0.02072	-0.03683 *	-0.05664 **	-0.01346 **	0.03077 *	-0.09670 **	-0.11163 *	-0.16061 ***	0.10853 ***	-0.01889	-0.22871	-0.04415 ***
	(0.0126)	(0.0211)	(0.0270)	(0.0059)	(0.0435)	(0.0607)	(0.0130)	(0.0130)	(0.0323)	(0.0366)	(0.2122)	(0.0140)
Board independence	-0.00169 ***	0.00055 *	-0.00464 ***	-0.00006	-0.00475 ***	-0.00533 ***	-0.02308 ***	-0.00815 ***	0.00426 ***	0.00303 ***	0.01111 **	0.00278 ***
	(0.0003)	(0.0003)	(0.0007)	(0.0001)	(0.0004)	(0.0006)	(0.0013)	(0.0001)	(0.0006)	(0.0005)	(0.0043)	(0.0003)
Ownership structure												
Ownership concentration	-0.07138 ***	0.01603	0.00557	0.01150 *	-0.09861 ***	0.07070	0.06380	-0.03714 ***	0.00772	0.02001	-0.07859	-0.06702 ***
	(0.0159)	(0.0192)	(0.0313)	(0.0065)	(0.0243)	(0.0459)	(0.0714)	(0.0108)	(0.0335)	(0.0332)	(0.2164)	(0.0179)
State ownership	-0.02232	0.01370	-0.04391	-0.02441 ***	-0.08907 **	-0.00214	-0.36675 ***	-0.00896	0.03995	-0.01175	0.41047	0.03883 **
	(0.0225)	(0.0147)	(0.0480)	(0.0069)	(0.0386)	(0.0380)	(0.1012)	(0.0133)	(0.0422)	(0.0260)	(0.2944)	(0.0168)
Foreign ownership in advanced economies	0.00076	-0.04065 **	-0.02378	-0.03077 ***	-0.05676	-0.03548	-0.03514	-0.01599 *	0.01862	-0.05505 *	0.03448	-0.08190 ***
	(0.0562)	(0.0196)	(0.0300)	(0.0060)	(0.0921)	(0.0414)	(0.0721)	(0.0091)	(0.1070)	(0.0302)	(0.1904)	(0.0212)
Foreign ownership in developing/emerging economies	-0.03716	-0.00650	0.05845	-0.05260 ***	-0.24156	-0.01443	0.16701	-0.01858	-0.08406	0.02404	0.07220	-0.01362
	(0.1132)	(0.0191)	(0.0476)	(0.0100)	(0.1795)	(0.0414)	(0.1075)	(0.0162)	(0.2132)	(0.0322)	(0.3535)	(0.0289)
Firm size and age												
Firm size	-0.02285 ***	-0.00764 *	-0.01155	-0.00805 ***	-0.02530 ***	-0.00316	-0.01355	-0.00653 *	-0.03725 ***	-0.00432	-0.04382	-0.00646
	(0.0031)	(0.0043)	(0.0085)	(0.0021)	(0.0049)	(0.0097)	(0.0196)	(0.0037)	(0.0066)	(0.0067)	(0.0523)	(0.0058)
Firm age	0.00139 **	0.00027 **	-0.00095	0.00047 ***	0.00213 **	0.00053 *	0.00647 *	0.00120 ***	0.00287 **	0.00009	0.01568 *	0.00063 ***
	(0.0006)	(0.0001)	(0.0016)	(0.0001)	(0.0010)	(0.0003)	(0.0037)	(0.0002)	(0.0013)	(0.0002)	(0.0094)	(0.0002)
Financial peformance and business activity												
Profitability	0.00011	-0.00067 *	0.00056	-0.00054 ***	0.00009	-0.00055	-0.00265	-0.00055 *	0.00055	0.00045	0.01369 **	-0.00107 ***
	(0.0003)	(0.0004)	(0.0010)	(0.0002)	(0.0005)	(0.0008)	(0.0022)	(0.0003)	(0.0006)	(0.0006)	(0.0067)	(0.0004)
Financial risk	-0.00173 *	-0.00067	-0.00209	-0.00068 *	-0.00218 *	-0.00164	-0.00757	-0.00103 *	-0.00192	-0.00009	-0.00550	-0.00136
	(0.0009)	(0.0008)	(0.0015)	(0.0004)	(0.0013)	(0.0015)	(0.0059)	(0.0006)	(0.0018)	(0.0018)	(0.0087)	(0.0010)
Solvency	0.00033	0.00023	0.00088 *	0.00049 ***	0.00033	-0.00054	0.00209 *	0.00051 ***	0.00031	0.00028	-0.00187	0.00021
	(0.0002)	(0.0002)	(0.0005)	(0.0001)	(0.0003)	(0.0004)	(0.0012)	(0.0001)	(0.0005)	(0.0003)	(0.0033)	(0.0002)
Business diversification	0.00416	0.00192	0.06472 **	0.00132 **	0.00904	-0.00491	0.07253	0.00246 **	0.00180	-0.00209	0.24645	0.00420 **
	(0.0055)	(0.0026)	(0.0253)	(0.0007)	(0.0086)	(0.0059)	(0.0560)	(0.0011)	(0.0117)	(0.0040)	(0.1619)	(0.0018)
Innovativeness	-0.00342	-0.01540 ***	-0.00392	-0.01517 ***	-0.00568	-0.00420	-0.02413	-0.01329 *	-0.00147	-0.01521 *	0.01046	-0.00356
	(0.0023)	(0.0057)	(0.0073)	(0.0042)	(0.0036)	(0.0116)	(0.0156)	(0.0069)	(0.0049)	(0.0087)	(0.0454)	(0.0116)
Const.	0.25377 ***	0.30602 ***	0.19076 ***	0.26142 ***	0.24366 ***	0.47578 ***	0.23959	0.41159 ***	-0.35826 ***	0.26592 ***	-2.88365 ***	0.05904
	(0.0264)	(0.0383)	(0.0708)	(0.0161)	(0.0417)	(0.0842)	(0.1642)	(0.0283)	(0.0592)	(0.0652)	(0.5340)	(0.0485)
Industriy fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670
Log pseudolikelihood	-5492.6623	-100.9090	-1002.1669	-10571.5690	-7109.0108	-944.2171	-984.0520	-11453.2880	-7150.2956	-704.4183	-463.3727	-6432.4518
Pseudo R2	0.0255	0.1808	0.0581	0.0891	0.0279	0.1646	0.1221	0.1799	0.0113	0.1421	0.0912	0.1889
F test	13.33 ***	5.22 ***	6.04 ***	40.86 ***	19.01 ***	10.75 ***	24.14 ***	129.24 ***	10.33 ***	5.77 **	4.35 ***	42.66 ***

(b) Companies with a female director(s) with control for sample selection

Estimator	Heckman two-step											
Dependent variable	Blau index of gender diversity in the boardroom				Blau index of gender diversity of insider directorship				Blau index of gender diversity of outsider directorship			
Firm type	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies	Chinese public companies	European public companies	Chinese private companies	European private companies
Model	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
Board composition												
Board size	0.00083	-0.00093	0.00273	0.00043	-0.00056	-0.00059	0.00764 ***	-0.00078	0.00017	-0.00050	-0.00596	-0.00172
	(0.0011)	(0.0051)	(0.0032)	(0.0004)	(0.0009)	(0.0010)	(0.0027)	(0.0005)	(0.0012)	(0.0007)	(0.0303)	(0.0057)
CEO duality	0.02397 **	-0.01619	0.00834	-0.00538 *	0.02345 ***	0.00231	0.03886	-0.06523 ***	0.02187 **	0.00681	0.04653	0.00058
	(0.0094)	(0.0138)	(0.0317)	(0.0032)	(0.0085)	(0.0262)	(0.0280)	(0.0046)	(0.0107)	(0.0211)	(0.0307)	(0.0052)
Board independence	-0.00029	0.00036 *	-0.00070	-0.00022 ***	-0.00163 ***	-0.00311 ***	-0.00653 ***	-0.00433 ***	0.00215 ***	0.00220 ***	0.00494 ***	0.00196 ***
	(0.0003)	(0.0002)	(0.0013)	(0.0000)	(0.0002)	(0.0004)	(0.0012)	(0.0001)	(0.0003)	(0.0003)	(0.0013)	(0.0001)
Ownership structure												
Ownership concentration	-0.01077	0.00602	-0.00741	0.00647 **	-0.00707	-0.00719	0.06598 ***	-0.01176 ***	0.00889	-0.01556	0.01169	-0.02623 ***
	(0.0125)	(0.0143)	(0.0274)	(0.0031)	(0.0115)	(0.0272)	(0.0230)	(0.0045)	(0.0144)	(0.0210)	(0.0267)	(0.0062)
State ownership	-0.01635	0.01322	-0.01788	-0.01252 ***	-0.03697 **	-0.00658	-0.14477 ***	0.00256	0.01177	-0.01041	0.05928	0.01247 **
	(0.0180)	(0.0121)	(0.0396)	(0.0038)	(0.0158)	(0.0232)	(0.0345)	(0.0051)	(0.0201)	(0.0177)	(0.0385)	(0.0063)
Foreign ownership in advanced economies	-0.01712	-0.02875 **	-0.02675	-0.01057 ***	-0.02482	0.00498	0.00410	-0.02017 ***	-0.00239	-0.00937	0.02860	-0.00626
	(0.0406)	(0.0133)	(0.0271)	(0.0029)	(0.0372)	(0.0255)	(0.0231)	(0.0040)	(0.0466)	(0.0195)	(0.0264)	(0.0062)
Foreign ownership in developing/emerging economies	-0.04137	-0.00832	0.02970	-0.02065 ***	-0.07232	-0.01649	0.05108	-0.01569 **	-0.05016	0.01694	-0.03189	0.00864
	(0.0833)	(0.0135)	(0.0413)	(0.0049)	(0.0795)	(0.0257)	(0.0347)	(0.0069)	(0.0984)	(0.0199)	(0.0401)	(0.0096)
Firm size and age												
Firm size	-0.01282 ***	-0.01286 ***	-0.00975	-0.00669 ***	-0.00460 *	-0.00996 *	-0.00716	-0.00332 **	-0.01353 ***	-0.00785 *	0.00245	-0.00289
	(0.0028)	(0.0031)	(0.0078)	(0.0010)	(0.0024)	(0.0059)	(0.0068)	(0.0014)	(0.0031)	(0.0045)	(0.0076)	(0.0020)
Firm age	0.00081	0.00015	0.00003	0.00017 ***	0.00031	0.00001	0.00179	0.00031 ***	0.00087	-0.00005	0.00074	0.00010
	(0.0005)	(0.0001)	(0.0014)	(0.0001)	(0.0004)	(0.0002)	(0.0012)	(0.0001)	(0.0005)	(0.0001)	(0.0014)	(0.0001)
Financial peformance and business activity												
Profitability	0.00013	-0.00065 ***	0.00018	-0.00013	-0.00008	-0.00022	-0.00060	0.00007	0.00022	0.00022	0.00077	-0.00015
	(0.0002)	(0.0002)	(0.0009)	(0.0001)	(0.0002)	(0.0005)	(0.0008)	(0.0001)	(0.0003)	(0.0004)	(0.0009)	(0.0002)
Financial risk	-0.00065	-0.00051	-0.00122	-0.00041 ***	-0.00027	-0.00022	-0.00215	-0.00017	-0.00038	0.00019	0.00219	-0.00028
	(0.0006)	(0.0005)	(0.0022)	(0.0002)	(0.0005)	(0.0009)	(0.0019)	(0.0002)	(0.0007)	(0.0007)	(0.0021)	(0.0004)
Solvency	0.00010	0.00018	0.00040	0.00017 ***	0.00000	-0.00047 *	0.00057	-0.00009 *	0.00004	0.00008	-0.00051	-0.00008
	(0.0002)	(0.0001)	(0.0004)	(0.0000)	(0.0001)	(0.0003)	(0.0004)	(0.0001)	(0.0002)	(0.0002)	(0.0004)	(0.0001)
Business diversification	0.00157	0.00009	0.03980	0.00046	0.00244	-0.00608 *	0.01984	0.00045	-0.00066	-0.00110	-0.02508	0.00063
	(0.0041)	(0.0018)	(0.0288)	(0.0003)	(0.0036)	(0.0034)	(0.0236)	(0.0005)	(0.0046)	(0.0027)	(0.0277)	(0.0006)
Innovativeness	-0.00309 *	-0.00978 **	-0.00334	-0.00932 ***	-0.00249	0.00639	-0.00714	0.00015	-0.00024	-0.00198	0.00309	-0.00146
	(0.0018)	(0.0043)	(0.0067)	(0.0021)	(0.0016)	(0.0080)	(0.0059)	(0.0029)	(0.0020)	(0.0062)	(0.0065)	(0.0038)
Const.	0.27621 ***	0.40131 ***	0.14690 *	0.37918 ***	0.38627 ***	0.63815 ***	0.33790 ***	0.58086 ***	0.11562 ***	0.43376 ***	0.12957	0.38636 ***
	(0.0314)	(0.0342)	(0.0883)	(0.0093)	(0.0270)	(0.0630)	(0.0680)	(0.0122)	(0.0346)	(0.0501)	(0.0854)	(0.0209)
Inverse Mill's ratio	0.22904 ***	0.10131 **	0.27646 **	0.13403 ***	0.06678 *	-0.23302 ***	0.13702	-0.14465 ***	0.15656 ***	-0.12347 **	-0.25296 **	-0.10427 ***
	(0.0426)	(0.0424)	(0.1124)	(0.0094)	(0.0362)	(0.0767)	(0.0888)	(0.0116)	(0.0464)	(0.0616)	(0.1081)	(0.0120)
Industriy fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670	9,905	1,643	1,773	22,670
Wald test (χ^2)	102.12 ***	235.75 ***	15.46	460.70 ***	230.50 ***	221.69 ***	213.69 ***	11506.48 ***	141.22 ***	179.26 ***	47.86 ***	1523.70 ***

Note: Panel (b) displays the second-stage estimation results. Table 2 provides detailed definitions and descriptive statistics of the variables used in estimation. Panels (d) and (e) of Appendix Table A1 report estimates of industry fixed effects. Standard errors are computed using the Huber–White sandwich estimator and 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.

Source: Authors' estimations

Appendix Table A1. Estimates of industry fixed effects

(a) Table 4

Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Agriculture, forestry, and fishing	-0.11951 (0.0985)	0.13293 (0.2245)	-0.22890 (0.4712)	-0.03539 (0.0761)	-0.03230 (0.1002)	0.00536 (0.1823)	-0.50969 (0.5935)	-0.15196** (0.0768)	-0.11949 (0.1011)	0.12310 (0.2133)	-0.05999 (0.5531)	-0.01452 (0.0825)
Mining and quarrying	-0.01174 (0.1378)	0.11533 (0.2506)	-1.50494* (0.8882)	-0.38544*** (0.1359)	0.09933 (0.1342)	0.29764 (0.2196)	-0.90316 (0.7184)	-0.28833** (0.1422)	-0.02936 (0.1316)	-0.53823*** (0.2098)	-0.43741 (0.8169)	-0.53404*** (0.1699)
Electricity, gas, steam, and air conditioning supply	-0.08153 (0.1242)	0.26782 (0.2250)	-0.33221 (0.4843)	-0.13554 (0.1017)	-0.32200*** (0.1199)	0.31646* (0.1757)	-0.10868 (0.4453)	-0.11425 (0.1010)	0.09017 (0.1134)	0.44840** (0.2032)	0.17409 (0.4989)	-0.13802 (0.1083)
Water supply	0.03166 (0.1155)	0.04856 (0.3038)	1.13246 (0.8371)	-0.00232 (0.0960)	0.01221 (0.1152)	0.08264 (0.3097)		-0.05330 (0.1007)	-0.04864 (0.1139)	0.13810 (0.3092)	0.75545 (0.9672)	-0.11194 (0.1090)
Construction	-0.04797 (0.1258)	0.03927 (0.1615)	0.19793 (0.3026)	-0.37892*** (0.0616)	-0.15751 (0.1200)	-0.06711 (0.1428)	0.40929 (0.3071)	-0.37909*** (0.0692)	0.00622 (0.1198)	0.07225 (0.1510)	-0.19925 (0.4000)	-0.37724*** (0.0819)
Wholesale and retail trade	0.11902*** (0.0412)	0.15720 (0.1470)	0.29836*** (0.0986)	0.20896*** (0.0470)	0.10646*** (0.0410)	0.26580** (0.1283)	0.34962*** (0.1037)	0.14038*** (0.0522)	0.11532*** (0.0409)	-0.05401 (0.1332)	0.10529 (0.1168)	0.18254*** (0.0656)
Transportation and storage	-0.15685 (0.1024)	-0.07423 (0.1773)	0.00213 (0.2289)	-0.07527 (0.0664)	-0.27217*** (0.1032)	-0.29599* (0.1523)	0.18609 (0.2442)	-0.04893 (0.0690)	-0.15451 (0.1020)	-0.10127 (0.1628)	-0.28489 (0.2841)	-0.26398*** (0.0797)
Accommodation and food service activities	0.17626 (0.2130)	-0.23637 (0.2048)	0.75381 (0.6177)	0.64928*** (0.1107)	0.07840 (0.2065)	0.08238 (0.1956)	0.38370 (0.6302)	0.75342*** (0.1212)	0.19927 (0.2074)	-0.19558 (0.2013)	0.30582 (0.6453)	0.32259** (0.1286)
Information and communication	0.04223 (0.0440)	-0.12200 (0.2161)	-0.54757*** (0.2014)	-0.12448 (0.0784)	0.05889 (0.0438)	0.07052 (0.2028)	-0.40795** (0.2067)	-0.00104 (0.0925)	0.09935** (0.0437)	-0.03454 (0.2185)	-0.57293** (0.2838)	-0.24413** (0.1076)
Financial and insurance activities	0.24498 (0.2445)	0.09618 (0.2045)	-0.22686 (0.3021)	0.26550* (0.1528)	-0.06496 (0.2012)	0.17455 (0.1703)	0.03481 (0.3121)	0.13471 (0.1513)	0.22228 (0.1853)	0.18791 (0.2011)	-0.46432 (0.3219)	0.26029 (0.1706)
Real estate activities	0.10035 (0.1231)	-0.69367** (0.3240)	-0.10014 (0.7058)	0.37987*** (0.1229)	-0.00169 (0.1220)	-0.28482 (0.2938)	0.18193 (0.7103)	0.34084*** (0.1098)	0.07698 (0.1205)	-0.72624** (0.3198)		0.28815** (0.1373)
Professional, scientific, and technical activities	0.07332 (0.0543)	0.06167 (0.2315)	-0.32654 (0.3195)	-0.02627 (0.0740)	0.08930* (0.0541)	0.26048 (0.2128)	-0.26659 (0.3301)	0.02621 (0.0757)	0.03975 (0.0545)	-0.32287 (0.2096)	-0.14156 (0.3423)	-0.23875*** (0.0913)
Administrative and support service activities	0.09488 (0.0801)	-0.09768 (0.2725)	0.19355 (0.3115)	0.32913*** (0.0935)	0.12596 (0.0804)	-0.35191 (0.2704)	0.38561 (0.3441)	0.38952*** (0.1041)	0.10703 (0.0809)	0.05393 (0.2652)	0.00801 (0.3544)	0.21529* (0.1239)

(b) Table 5(a)

Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Agriculture, forestry, and fishing	-0.09611 (0.0889)	0.08406 (0.1189)	-0.72174 (0.5825)	0.17116*** (0.0294)	-0.04446 (0.0906)	0.06909 (0.1569)	-0.85874 (0.9460)	-0.12734*** (0.0470)	-0.15832 (0.1292)	0.06754 (0.1335)	-0.07391 (0.1840)	0.15704*** (0.0337)
Mining and quarrying	-0.07057 (0.1198)	-0.23044* (0.1317)	-0.61729 (0.8773)	-0.23963*** (0.0652)	-0.10482 (0.1107)	0.10300 (0.1352)	-1.53368* (0.8547)	-0.30413*** (0.0802)	0.00741 (0.1683)	-0.43607** (0.2108)	-2.83922 (2.3005)	-0.27995*** (0.0889)
Electricity, gas, steam, and air conditioning supply	-0.30773*** (0.1165)	0.10274 (0.1013)	-0.53155 (0.6234)	-0.06415 (0.0639)	-0.34909*** (0.1302)	0.22779** (0.0915)	-0.31260 (0.5755)	-0.22077** (0.1029)	-0.28768* (0.1669)	0.13567 (0.1308)	-1.39787 (1.0637)	-0.02274 (0.0583)
Water supply	0.05278 (0.1252)	0.03894 (0.2404)	0.75122 (0.6081)	0.10718** (0.0458)	0.05771 (0.1078)	0.03859 (0.3501)	-0.17239*** (0.0081)	0.16534*** (0.0519)	0.04768 (0.2058)	0.04524 (0.2816)	0.38775 (1.2028)	0.03990 (0.0658)
Construction	-0.02067 (0.1251)	-0.04599 (0.1039)	0.20140 (0.3141)	-0.20768*** (0.0322)	-0.11246 (0.1190)	-0.14629 (0.0991)	0.53975* (0.3266)	-0.21638*** (0.0376)	0.07067 (0.1851)	0.05495 (0.1173)	0.29846 (0.3501)	-0.21695*** (0.0458)
Wholesale and retail trade	0.09833** (0.0424)	0.02966 (0.0796)	0.32557*** (0.1067)	0.19118*** (0.0221)	0.05140 (0.0377)	0.25615*** (0.0860)	0.33668*** (0.1091)	0.11774*** (0.0263)	0.15146** (0.0653)	-0.03818 (0.0963)	-0.17431 (0.1321)	0.17067*** (0.0308)
Transportation and storage	-0.28817*** (0.0952)	-0.04759 (0.1080)	-0.17083 (0.2513)	-0.08862** (0.0363)	-0.29792*** (0.1149)	-0.06593 (0.1620)	0.01669 (0.2403)	-0.06155 (0.0467)	-0.28351* (0.1309)	-0.01944 (0.1236)	-0.46379* (0.2635)	-0.09513** (0.0445)
Accommodation and food service activities	0.22644 (0.1696)	-0.10629 (0.1468)	0.48490 (0.4486)	0.20148*** (0.0383)	0.19202 (0.1868)	-0.03618 (0.1895)	0.13023 (0.5040)	0.27910*** (0.0515)	0.28423 (0.2230)	-0.07789 (0.1649)	0.39510 (0.4336)	0.13815*** (0.0501)
Information and communication	0.06385* (0.0385)	0.11065 (0.1935)	-0.77977** (0.3140)	0.00817 (0.0442)	0.04291 (0.0401)	0.24564 (0.1631)	-0.51177* (0.2857)	0.02566 (0.0650)	0.09287* (0.0526)	0.11813 (0.2354)	-0.24241* (0.1387)	-0.02697 (0.0573)
Financial and insurance activities	0.06886 (0.2143)	0.14526 (0.1184)	-0.03135 (0.5266)	0.50740*** (0.0625)	-0.00712 (0.1706)	0.09290 (0.1298)	-0.23396 (0.3301)	0.59113*** (0.0660)	-0.01366 (0.2672)	0.16205 (0.1338)	-0.88313 (1.1293)	0.48585*** (0.0868)
Real estate activities	0.07446 (0.1333)	-0.51106 (0.3245)	-0.40482 (0.7570)	0.23899*** (0.0395)	0.02771 (0.1173)	-0.18666 (0.3276)	-0.08104 (0.6919)	0.35135*** (0.0535)	0.14591 (0.2060)	-0.55569 (0.3724)	0.20872 (0.2287)	0.21100*** (0.0511)
Professional, scientific, and technical activities	0.03342 (0.0512)	0.07155 (0.1560)	-0.23196 (0.4569)	0.06756** (0.0324)	0.02767 (0.0545)	0.26752* (0.1490)	-0.48324 (0.4528)	0.18529*** (0.0341)	0.01084 (0.0689)	0.00238 (0.1707)	-0.31851 (0.2281)	-0.02988 (0.0483)
Administrative and support service activities	0.18417** (0.0827)	-0.04424 (0.1719)	0.20870 (0.2998)	0.14538*** (0.0444)	0.14615** (0.0670)	-0.30939 (0.3096)	0.55440 (0.3503)	0.22554*** (0.0583)	0.19735 (0.1433)	-0.00695 (0.1749)	-0.40312* (0.2279)	0.08318 (0.0625)

(c) Table 5(b)

Model	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
Agriculture, forestry, and fishing	-0.08938 (0.2389)	0.24838 (1.0023)	-3.01383 (8.2210)	0.32901*** (0.0934)	0.02649 (0.1195)	0.05194 (0.2250)	-0.82869 (0.8070)	-0.10370*** (0.0354)	-0.11587 (0.2004)	0.19644 (0.8383)	-2.18514 (7.4140)	0.43271*** (0.0851)
Mining and quarrying	-0.28793 (0.2877)	-0.80367 (0.9575)	-15.10780 (12.8582)	-0.07881 (0.1805)	-0.12505 (0.1434)	-0.07485 (0.2140)	-2.14546* (1.2622)	-0.17053** (0.0699)	-0.16288 (0.2409)	-0.72882 (0.8008)	-1.29623 (1.1596)	0.09172 (0.1644)
Electricity, gas, steam, and air conditioning supply	-0.83226*** (0.2549)	0.30408 (0.7747)	-3.90377 (6.5989)	-0.03659 (0.1219)	-0.37960*** (0.1272)	0.06424 (0.1721)	-0.54172 (0.6478)	-0.03366 (0.0457)	-0.45266** (0.2136)	0.23984 (0.6479)	-3.36204 (5.9511)	-0.00292 (0.1110)
Water supply	0.04109 (0.2631)	1.11668 (1.6661)	11.57536 (14.1869)	-0.17120 (0.1194)	0.02478 (0.1313)	-0.17236 (0.3815)	0.80150 (1.3926)	-0.05559 (0.0452)	0.01631 (0.2205)	1.28904 (1.3934)	10.77386 (12.7943)	-0.11560 (0.1087)
Construction	-0.25037 (0.2659)	-0.74907 (0.7261)	2.80859 (4.8377)	0.02333 (0.0886)	-0.23358* (0.1325)	-0.34386** (0.1628)	0.53332 (0.4749)	-0.09358*** (0.0347)	-0.01679 (0.2227)	-0.40520 (0.6073)	2.27527 (4.3628)	0.11692 (0.0807)
Wholesale and retail trade	-0.00618 (0.0986)	-0.27037 (0.6364)	2.90981 (1.9727)	0.16889*** (0.0648)	-0.06948 (0.0492)	0.20946 (0.1422)	0.39066** (0.1936)	0.09844*** (0.0250)	0.06330 (0.0826)	-0.47983 (0.5323)	2.51915 (1.7790)	0.07044 (0.0590)
Transportation and storage	-0.74254*** (0.2393)	-0.01262 (0.7500)	-0.15062 (3.4070)	-0.14508* (0.0844)	-0.39456*** (0.1195)	-0.08918 (0.1685)	0.03189 (0.3344)	-0.05751* (0.0323)	-0.34798* (0.2006)	0.07657 (0.6272)	-0.18251 (3.0726)	-0.08756 (0.0768)
Accommodation and food service activities	0.08748 (0.4759)	0.48750 (0.9948)	7.58172 (8.5576)	-0.25176* (0.1379)	0.11260 (0.2373)	0.26646 (0.2260)	0.50671 (0.8400)	0.13375*** (0.0519)	-0.02512 (0.3986)	0.22104 (0.8320)	7.07500 (7.7175)	-0.38552*** (0.1256)
Information and communication	0.04251 (0.1008)	0.28828 (0.9996)	-6.13865 (4.2279)	0.06485 (0.1113)	0.01311 (0.0503)	0.12332 (0.2251)	-0.63855 (0.4150)	0.05331 (0.0436)	0.02940 (0.0845)	0.16495 (0.8360)	-5.50010 (3.8129)	0.01154 (0.1013)
Financial and insurance activities	1.48455*** (0.3454)	0.57378 (0.8125)	-2.65452 (4.2847)	1.10607*** (0.1608)	-0.19385 (0.1706)	0.06002 (0.1822)	-0.15036 (0.4206)	0.05743 (0.0598)	1.67839*** (0.2882)	0.51376 (0.6795)	-2.50417 (3.8641)	1.04864*** (0.1465)
Real estate activities	-0.17006 (0.2718)	-0.08746 (1.7534)	-1.07290 (12.4053)	0.09444 (0.1386)	-0.14403 (0.1353)	0.22013 (0.4032)	-0.20164 (1.2177)	0.16728*** (0.0516)	-0.02603 (0.2275)	-0.30759 (1.4664)	-0.87126 (1.1188)	-0.07284 (0.1262)
Professional, scientific, and technical activities	-0.03853 (0.1253)	-0.03567 (0.9836)	-3.79195 (5.2579)	-0.12730 (0.0897)	-0.00831 (0.0625)	0.12899 (0.2212)	-0.31335 (0.5161)	0.06563* (0.0340)	-0.03022 (0.1050)	-0.16466 (0.8226)	-3.47860 (4.7418)	-0.19293** (0.0817)
Administrative and support service activities	0.24955 (0.1876)	-0.15487 (1.3005)	1.97856 (4.9922)	-0.06761 (0.1274)	0.06565 (0.0937)	-0.04924 (0.2942)	0.50601 (0.4900)	0.16801*** (0.0491)	0.18390 (0.1572)	-0.10562 (1.0876)	1.47256 (4.5022)	-0.23562** (0.1161)

(d) Table 6(a)

Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Agriculture, forestry, and fishing	-0.01984 (0.0287)	0.01597 (0.0289)	0.08542 (0.1623)	0.01216 (0.0089)	-0.00614 (0.0432)	0.04186 (0.0650)	-0.20021 (0.4715)	0.02577 (0.0192)	-0.09435 (0.0624)	-0.03520 (0.0485)	0.88491 (0.8536)	-0.02241 (0.0224)
Mining and quarrying	-0.00445 (0.0335)	-0.01001 (0.0266)	-0.32960 (0.2366)	-0.04889*** (0.0179)	0.04276 (0.0506)	0.07006 (0.0560)	-0.69336* (0.4116)	-0.01827 (0.0314)	0.02919 (0.0693)	-0.09110** (0.0433)	0.26164 (0.8254)	-0.06008 (0.0444)
Electricity, gas, steam, and air conditioning supply	-0.02547 (0.0284)	0.06275*** (0.0189)	-0.10710 (0.1407)	-0.00662 (0.0110)	-0.10558** (0.0501)	0.10311** (0.0431)	-0.04089 (0.3185)	0.00679 (0.0212)	0.04727 (0.0610)	0.11440*** (0.0297)	-0.44669 (0.7639)	0.02225 (0.0259)
Water supply	0.01258 (0.0313)	0.00305 (0.0542)	0.33859 (0.2752)	0.00860 (0.0110)	-0.00547 (0.0491)	0.07194 (0.1072)	-3.32012*** (0.2411)	0.03061 (0.0210)	-0.05243 (0.0691)	0.08263 (0.0723)	-1.21887*** (0.1319)	0.00236 (0.0284)
Construction	-0.01431 (0.0297)	-0.00502 (0.0199)	0.12836 (0.0827)	-0.04963*** (0.0088)	-0.07366 (0.0496)	-0.00022 (0.0421)	0.26163 (0.1950)	-0.06339*** (0.0144)	0.03700 (0.0650)	-0.00619 (0.0323)	-0.73013 (0.6616)	0.01518 (0.0237)
Wholesale and retail trade	0.03440*** (0.0114)	0.01698 (0.0170)	0.10266*** (0.0314)	0.03154*** (0.0067)	0.04295** (0.0177)	0.06419 (0.0407)	0.16930** (0.0743)	0.02427** (0.0103)	0.07338*** (0.0244)	-0.02338 (0.0289)	-0.08156 (0.2281)	-0.03250 (0.0238)
Transportation and storage	-0.05606** (0.0266)	-0.00140 (0.0214)	-0.03846 (0.0725)	-0.00682 (0.0085)	-0.09932** (0.0437)	-0.03413 (0.0500)	0.05381 (0.1773)	0.00777 (0.0145)	-0.08056 (0.0580)	0.01232 (0.0340)	-0.00631 (0.4913)	0.00241 (0.0213)
Accommodation and food service activities	0.06605 (0.0570)	-0.01261 (0.0315)	0.18752 (0.1639)	0.07432*** (0.0134)	0.05879 (0.0891)	-0.00496 (0.0683)	0.22231 (0.3378)	0.06208*** (0.0232)	0.10616 (0.1154)	-0.04763 (0.0500)	-1.13425*** (0.1220)	-0.02385 (0.0413)
Information and communication	0.01362 (0.0122)	-0.00799 (0.0274)	-0.17543*** (0.0650)	-0.01733 (0.0115)	0.03096* (0.0186)	0.05298 (0.0637)	-0.25150 (0.1581)	0.01225 (0.0191)	0.05788** (0.0265)	-0.01466 (0.0393)	-0.79655 (0.6537)	-0.04512 (0.0355)
Financial and insurance activities	0.04090 (0.0360)	0.03672 (0.0228)	-0.09622 (0.0826)	0.05278*** (0.0149)	-0.01541 (0.0646)	0.04400 (0.0533)	-0.12638 (0.1822)	0.07498*** (0.0284)	0.00385 (0.0790)	0.04197 (0.0352)	-0.76454 (0.5459)	0.05440 (0.0388)
Real estate activities	0.03551 (0.0310)	-0.07927 (0.0550)	-0.08598 (0.2509)	0.05257*** (0.0130)	0.00940 (0.0496)	-0.07677 (0.1009)	0.08374 (0.4228)	0.05981*** (0.0226)	0.05453 (0.0686)	-0.09696 (0.0962)	-1.12719*** (0.1227)	0.06063* (0.0317)
Professional, scientific, and technical activities	0.02428 (0.0152)	-0.00787 (0.0292)	-0.13287 (0.1179)	-0.00618 (0.0087)	0.05288** (0.0233)	0.03374 (0.0628)	-0.05610 (0.2621)	0.03303** (0.0138)	0.02826 (0.0335)	-0.05957 (0.0473)	-1.10604*** (0.1201)	-0.03630 (0.0230)
Administrative and support service activities	0.03476 (0.0223)	-0.01144 (0.0361)	0.12012 (0.0960)	0.05028*** (0.0130)	0.06123* (0.0338)	-0.19599** (0.0945)	0.41931* (0.2489)	0.06351*** (0.0200)	0.02712 (0.0507)	-0.05133 (0.0582)	0.61521 (0.5318)	-0.00969 (0.0410)

(e) Table 6(b)

Model	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
Agriculture, forestry, and fishing	-0.00633 (0.0208)	0.02080 (0.0193)	-0.03210 (0.1439)	-0.00047 (0.0045)	0.01592 (0.0190)	0.01946 (0.0380)	-0.11159 (0.1293)	0.01112 (0.0068)	-0.03914 (0.0238)	-0.03110 (0.0284)	0.24595 * (0.1417)	-0.01498 ** (0.0075)
Mining and quarrying	-0.00758 (0.0257)	-0.01665 (0.0184)	-0.13563 (0.2251)	-0.02786 *** (0.0088)	0.01670 (0.0228)	0.01046 (0.0347)	-0.30845 (0.2021)	0.01336 (0.0121)	0.01575 (0.0289)	-0.06154 ** (0.0270)	0.58579 *** (0.2213)	0.00351 (0.0160)
Electricity, gas, steam, and air conditioning supply	-0.04117 * (0.0226)	0.04852 *** (0.0148)	-0.04654 (0.1155)	0.00191 (0.0059)	-0.05859 *** (0.0203)	0.01987 (0.0280)	-0.07290 (0.0970)	0.00798 (0.0081)	-0.00055 (0.0255)	0.07170 *** (0.0216)	0.03563 (0.1123)	0.00996 (0.0100)
Water supply	0.00508 (0.0232)	0.02224 (0.0326)	0.23538 (0.2484)	-0.00280 (0.0058)	-0.00417 (0.0209)	0.03761 (0.0603)	0.08519 (0.2066)	0.00421 (0.0080)	-0.02660 (0.0263)	0.06401 (0.0482)	-0.38261 (0.2402)	-0.01696 * (0.0101)
Construction	-0.02282 (0.0237)	-0.01520 (0.0140)	0.02125 (0.0847)	-0.01731 *** (0.0043)	-0.04619 ** (0.0211)	-0.01152 (0.0265)	0.09563 (0.0715)	0.00736 (0.0059)	0.01857 (0.0267)	-0.01302 (0.0205)	-0.10252 (0.0823)	0.02476 *** (0.0084)
Wholesale and retail trade	0.02244 *** (0.0088)	0.00980 (0.0122)	0.05197 (0.0345)	0.01466 *** (0.0031)	0.00696 (0.0078)	0.01234 (0.0232)	0.01662 (0.0281)	-0.00666 (0.0045)	0.02637 *** (0.0099)	-0.02571 (0.0179)	-0.07448 ** (0.0334)	-0.02435 *** (0.0068)
Transportation and storage	-0.04547 ** (0.0211)	0.00149 (0.0145)	-0.04558 (0.0596)	-0.00273 (0.0041)	-0.03817 ** (0.0190)	-0.00929 (0.0275)	0.00033 (0.0507)	0.00438 (0.0058)	-0.03175 (0.0239)	0.01905 (0.0214)	-0.01229 (0.0581)	0.00435 (0.0075)
Accommodation and food service activities	0.06074 (0.0424)	0.01118 (0.0193)	0.14330 (0.1498)	0.02679 *** (0.0067)	0.01909 (0.0378)	0.04165 (0.0362)	0.06532 (0.1191)	-0.02891 *** (0.0095)	0.04010 (0.0477)	0.00308 (0.0285)	-0.21220 (0.1443)	-0.04001 *** (0.0123)
Information and communication	0.01294 (0.0089)	-0.00763 (0.0193)	-0.14281 * (0.0740)	-0.00621 (0.0054)	0.01161 (0.0080)	0.02882 (0.0362)	-0.07622 (0.0643)	0.01512 * (0.0078)	0.02078 ** (0.0101)	-0.00790 (0.0284)	0.07751 (0.0725)	-0.00948 (0.0109)
Financial and insurance activities	0.04043 (0.0325)	0.03156 ** (0.0156)	-0.04599 (0.0750)	0.02628 *** (0.0078)	0.00667 (0.0273)	0.01443 (0.0299)	-0.06033 (0.0649)	0.02194 ** (0.0110)	-0.00018 (0.0351)	0.01620 (0.0230)	-0.02800 (0.0728)	-0.00478 (0.0132)
Real estate activities	0.01875 (0.0244)	-0.05333 (0.0344)	0.00528 (0.2172)	0.02020 *** (0.0067)	-0.00033 (0.0216)	0.05441 (0.0631)	0.08084 (0.1857)	-0.01189 (0.0093)	0.01233 (0.0273)	0.00062 (0.0509)	-0.04954 (0.2118)	0.00623 (0.0119)
Professional, scientific, and technical activities	0.02066 * (0.0111)	-0.01875 (0.0190)	-0.07286 (0.0920)	-0.01112 ** (0.0044)	0.02044 ** (0.0100)	0.00323 (0.0362)	0.08696 (0.0953)	0.00494 (0.0060)	0.00830 (0.0125)	-0.04280 (0.0281)	-0.04289 (0.0908)	-0.01724 ** (0.0082)
Administrative and support service activities	0.01991 (0.0166)	-0.00954 (0.0252)	0.04269 (0.0874)	0.02569 *** (0.0062)	0.03148 ** (0.0149)	-0.05982 (0.0480)	0.16525 ** (0.0735)	0.00113 (0.0088)	0.00334 (0.0188)	-0.01942 (0.0371)	0.00147 (0.0849)	-0.01901 (0.0128)

Note: Manufacturing sector is the reference (default) category.

Source: Authors' estimations