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Gender diversity and audit fees: Insights from a principal-principal agency conflict setting

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ABSTRACT

This study delves into how the presence of female directors can impact audit fees, with specific focus on addressing the unique principal-principal agency conflict. Using a sample of Spanish non-financial companies listed on the stock exchange between 2012 and 2022, the study employs winsorization for data normalization and implements various regression techniques to achieve a thorough evaluation. Findings reveal that the inclusion of female directors leads to higher audit fees. This outcome aligns with two potential explanations: firstly, the increasing demands for audit quality driven by female directors' superior monitoring abilities, favoured by controlling owners (demand perspective); and secondly, the possibility that auditors face heightened litigation and reputational risks because of female directors being appointed as tokens or for "window dressing" purposes by controlling owners who engage in expropriation activities. Further analysis indicates that our results are primarily influenced by the demand explanation. The study highlights that the corporate governance role of female directors is more pronounced in firms where substantial disparity exists between the controlling owner's voting rights and cash flow rights, emphasizing their critical role in mitigating Type II agency conflicts. These insights underline the key role of female directors in promoting effective corporate governance through auditing, and they provide useful recommendations for policy makers and business leaders in designing governance and regulatory frameworks, particularly in environments where principal-principal agency conflicts are prominent.

1. Introduction

Following accounting scandals such as Enron and WorldCom, the dominant focus has been on reinforcing corporate governance in an effort to restore investor confidence. The board's structure is central to this effort, given its crucial role in mediating agency conflicts stemming from differences between management and shareholder interests –known as Type I agency conflicts. Ensuring accurate financial reporting is essential in this pursuit, as it significantly impacts how external investors and shareholders assess a company's long-term sustainability (Fernández-Méndez & Pathan, 2023; Garcia-Blandon, Argilés-Bosch, & Ravenda, 2019; Gul, Srinidhi, & Tsui, 2008).

At the same time, social, regulatory, and academic fields have acknowledged the importance of women in corporate boardrooms, thereby encouraging research into how gender diversity affects corporate decision making (Croson & Gneezy, 2009). However, research findings remain inconclusive, particularly vis-à-vis the impact of gender diversity on audit fees. While some findings align with a supply-based perspective –suggesting that female directors reduce audit fees– others are consistent with a demand-based viewpoint and conclude that female directors increase audit fees by enhancing audit quality (Gul et al., 2008; Ittonen, Miettinen, & Vähämaa, 2010; Lai, Srinidhi, Gul, & Tsui, 2017; Nekhili, Gull, Chtioui, & Radhouane, 2020).

Our study aims to shed light on this topic by focusing on the Spanish context which is characterized –as are most countries in continental Europe– by weak investor protection and a prevalence of ownership concentration (Bona-Sánchez, Pérez-Alemán, & Santana-Martín, 2019; Cuervo, 2002; Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2008; García-Meca, López-Iturriaga, & Santana-Martín, 2022; Gutiérrez & Saez Lacave, 2018; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998; Mangena, Priego, & Manzaneque, 2020). In this environment, the primary agency conflict shifts to one arising from differences between

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controlling and minority shareholders –known as Type II or principal-principal agency conflict (Dharwadkar, George, & Brandes, 2000; La Porta, Lopez-de-Silanes, & Shleifer, 1999; Young, Peng, Ahlstrom, Bruton, & Jiang, 2008). While not universally adopted, this terminology has been used in the literature to discuss the complexities of agency conflicts within different governance contexts. Within this framework, we analyse how female directors influence audit fees, thereby addressing a gap in the literature that has predominantly focused on Type I agency conflict, which is typical of diffuse ownership structures. This differentiation is crucial for our analysis, given the distinct governance challenges and mechanisms required to mitigate each type of conflict.

Our findings suggest that the nomination of women directors selected due to their superior monitoring skills provides controlling shareholders with a vehicle to signal their commitment to long-term value creation and effective corporate governance. In such a context, female board members increase their demands for audit quality in order to strengthen their reputation as vigilant overseers in the presence of principal-principal agency conflicts. Our research also indicates that the corporate governance role of female directors intensifies in the presence of a wedge between the controlling owners' voting power and cash flow rights. This suggests that female directors wield significant influence in situations characterized by intensified Type II agency conflicts.

This study contributes to the literature investigating the role of female directors in audit service costs. In particular, the study enriches the existing body of research by providing evidence that female directors help reduce the principal-principal agency conflict through greater audit coverage and that they provide a vehicle for signalling the controlling shareholder's genuine commitment to voluntarily limit the extraction of private rents –an aspect often overlooked in prior studies. We also contribute to gender diversity literature by highlighting the crucial role female directors play in mitigating Type II agency conflicts in contexts where board gender quotas –although legally established– impose lighter penalties for non-compliance when compared to other jurisdictions where violating these quotas leads to significant legal or financial consequences (De Cabo, Terjesen, Escot, & Gimeno, 2019; Martínez-García, Terjesen, & Gómez-Ansón, 2022).

2. Institutional background

Spain's Corporate Governance Code-2006 (CNMV 2006) heralded a major step forward towards gender diversity on corporate boards by recommending the inclusion of women. Yet, it lacked enforceable quotas, merely requiring the presence of a single female member in order to fulfil compliance. Progression of gender diversity policies was furthered by the "Law of Equality" –Organic Law 3/2007– which set forth an ambitious goal for listed firms: achieving 40 % female representation on boards by 2015 (Reguera-Alvarado, de Fuentes, & Laffarga, 2017). Despite this, by 2015 the initial enthusiasm had waned. This decline was attributed to various factors, such as a shortage of willing female candidates, together with austerity measures that overshadowed gender equality concerns. This led to the revision of targets to a more achievable goal of 30 % female representation on boards by 2020 (Gabaldon & Giménez, 2017).

By 2020, female representation on boards had aligned with the objectives of the revised governance code, leading policymakers to establish a minimum of 30 % female board members and to propose a target of 40 % within the following two years (CNMV 2020). The nature of these regulations –which lacked relevant punitive measures for non-compliance– contrasts sharply with the stringent "hard" laws of countries such as Norway and Italy, where failure to comply results in penalties and exclusion from the stock market. The efficacy of these regulations remains a topic of debate, particularly in light of Kanter's (1977) tokenism theory, which challenges the notion that merely increasing numbers leads to meaningful qualitative change.

In this context, Spain presents an interesting case to explore the impact of female directors on audit fees. Although backed up by legislation, the country's approach to board gender quotas imposes lighter penalties for non-compliance when compared to other jurisdictions where violating such quotas entails significant legal or financial repercussions (De Cabo et al., 2019; Martínez-García et al., 2022). This distinct perspective offers insights into why companies appoint female directors, highlighting motivations such as seeking social approval and enhancing corporate reputation (Navarro-García, Ramón-Llorens, & García-Meca, 2022; Peña-Martel, Pérez-Alemán, & Santana-Martín, 2022).

Given the low investor protection and litigation risk as well as the prevalence of concentrated ownership (Djankov et al., 2008; Faccio & Lang, 2002; La Porta et al., 1999), the Spanish corporate environment offers a good opportunity to investigate the role of female directors in shaping audit fees from a different perspective to the one considered in previous studies. The existing literature highlights the role of female directors in promoting audit quality and mitigating Type I agency conflict (Aldamen, Hollindale, & Ziegelmayer, 2018; Fernández-Méndez & Pathan, 2023; Gul et al., 2008; Huang, Huang, & Lee, 2014; Lai et al., 2017; Miglani & Ahmed, 2019). Yet, the influence of female directors on audit policies in a setting where Type II agency conflict prevails remains complex and underexplored. Given the significant control exerted by dominant owners over board and director nominations (Ben-Amar, Francoeur, Hafsi, & Labelle, 2013; García-Meca & Santana-Martín, 2023), and their influence on financial reporting and audit policies (Fan & Wong, 2002), this study is well-positioned to offer valuable insights into the impact of female directors on audit fees in the Spanish context.

3. Literature review

The global discussion surrounding board gender diversity has gained attention globally, with numerous countries encouraging female representation. Despite these efforts, women remain underrepresented in board positions, and the full extent of gender diversity's impact on financial reporting policies remains unclear.

Various studies have documented mixed effects of female directors on earnings quality, ranging from positive influences (Arun, Almahrog, & Aribi, 2015; Gull, Nekhili, Nagati, & Chtioui, 2018; Srinidhi, He, & Firth, 2014) to neutral or negative outcomes when controlling for access discrimination (Amran, Abdul Manaf, & Ishak, 2016; García Lara, García Osma, Mora, & Scapin, 2017; Zalata & Abdelfattah, 2021). Tee and Kasipillai (2022) further suggest that a country's institutional framework can significantly influence the supervisory ability of female directors, thus highlighting the complex interplay of political connections and family ownership in shaping governance outcomes.

An increasing number of researchers have explored the relationship between female directors and audit fees. Evidence from the US (Harjoto, Laksmana, & Lee, 2015; Ittonen et al., 2010), France (Nekhili et al., 2020), China (Alkebsee, Tian, Usman, Siddique, & Alhebry, 2021), and Shanghai (Gull, Atif, Issa, Usman, & Siddique, 2021) suggests that audit fees are primarily influenced by supply factors. In this context, female directors may potentially reduce audit fees by enhancing board monitoring effectiveness. This effect has been attributed to the reduction in both the effort and the risk perceived by external auditors, and is not solely dependent on directors' financial expertise but also on their accounting knowledge (Garcia-Blandon, Argilés-Bosch, Ravenda, & Castillo-Merino, 2023).

Conversely, studies embracing the demand perspective argue that female directors may increase audit fees. For instance, in the US, the presence of women directors has been associated with higher fees, interpreted as a call for heightened audit coverage in complex and ethically challenging contexts (Gul et al., 2008; Huang et al., 2014; Lai et al., 2017). This view is supported by international evidence from countries such as Australia or Sweden (Aldamen et al., 2018; Fernández-Méndez & Pathan, 2023; Sellami & Cherif, 2020), suggesting that female financial experts on audit committees correlate with higher fees due to increased demands for audit coverage for monitoring purposes.

Despite the existing research, the literature remains inconclusive and often presents conflicting results from both the supply and demand perspectives. Additionally, studies examining this relationship from a demand-based perspective have primarily focused on the contribution of women directors in reducing Type I agency conflicts. Interestingly, the role of female directors in addressing Type II agency conflicts –which are especially relevant in the context of corporate governance in Spain– has been somewhat overlooked.

The Spanish business environment is characterized by a lack of investor protection and a low probability of insiders' facing legal action due to limited litigation risk (Djankov et al., 2008; La Porta et al., 1998). In such a setting, ownership concentration creates the conditions for a new agency conflict arising from the conflicting interests of controlling and minority shareholders, which is exacerbated by the presence of pyramidal structures (Claessens, Djankov, Fan, & Lang, 2002: Cuervo, 2002). In fact, the use of pyramids allows major shareholders to effectively separate ownership from control, making it challenging for minority investors to discern the extent of this separation and the diversion of company resources. In such a scenario, controlling owners might have incentives to exploit the wealth of minority shareholders.

Recent research has brought attention to the concentration of ownership in Spanish firms, highlighting the significant presence of Type II agency conflicts and the challenges posed by tunnelling activities, which have a detrimental effect on minority shareholders (Bona-Sánchez et al., 2019; García-Meca et al., 2022; Gutiérrez & Saez Lacave, 2018; Mangena et al., 2020). Moreover, the Spanish corporate landscape provides concrete examples of these agency conflicts. For instance, Abengoa –a multinational renowned for its sustainable technology solutions– came under investigation by the National Court following reports from 594 minority shareholders who claimed losses totalling 32 million euros due to alleged corporate irregularities. Accusations against former executives and major financial institutions included fraud, document falsification, and disloyal management practices. These actions are believed to have devalued the company, transferring profitable operations to other entities to the detriment of minority shareholders (Cinco Días, 2022). Another case involves the Banco Popular, where minority shareholders were left with few avenues to seek compensation after the bank's collapse over six years ago. The European Union's General Court upheld the resolution process leading to Banco Santander's acquisition of Banco Popular for a nominal one euro, leaving approximately 300,000 shareholders and creditors unable to recover their investments (Morcillo, 2024). These instances underscore the pervasive Type II agency conflicts in Spain, where the interests of controlling shareholders often take precedence over those of minority shareholders.

In response to these dynamics, the Spanish regulatory framework has evolved significantly in an effort to better protect the interests of minority shareholders. The Corporate Governance Code for Listed Companies 2020 –issued by the Spanish National Securities Market Commission (CNMV)– reflects current ownership structures and governance practices in Spain. This governance code provides specific recommendations to address conflicts of interest between majority and minority shareholders, demonstrating the regulator's recognition of the principal-principal conflicts at play. For instance, the code emphasizes the need for increased transparency and fair treatment of shareholders to address the challenges posed by concentrated ownership.

Additionally, Directive (EU) 2017/828, which aimed to promote shareholder involvement and which amended Directive 2007/36/EC, known as the Shareholders' Rights Directive (SRD), was finally transposed into Spanish law through Royal Decree-Law 5/2021, issued on March 12, to implement extraordinary measures supporting business solvency in response to the COVID-19 pandemic. This royal decree-law introduced amendments to the Capital Companies Law and other regulations in order to align Spanish legislation with the requirements of the European Directive. The key innovations include enhancing shareholders' rights in listed companies, increasing transparency in director and executive remuneration, and regulating transactions with related parties, all aimed at enhancing shareholder engagement in corporate governance and at better safeguarding their interests, particularly those of minority shareholders.

Taking into account this comprehensive evidence, it is clear that Type II agency conflict holds both theoretical significance and practical importance within the Spanish business setting. The unique governance features of the Spanish context thus call for a comprehensive appraisal of how gender diversity on corporate boards can impact audit fees. This is particularly crucial given the prevalence of principal-principal agency conflicts in jurisdictions with similar ownership structures (Alkebsee et al., 2021; Conyon & He, 2012; Fan, Wang, & Wu, 2023; Hu, Jiang, & Wu, 2023; Song, Yao, Su, & Lin, 2021; Wu & Dong, 2021). Moreover, principal-principal agency conflicts may manifest themselves differently across cultural and sectoral contexts, leading to varied outcomes for minority shareholders. For instance, in the Asian context, Downs, Ooi, Wong, and Ong (2016) show that real estate investment trust managers do not exploit wealth from minority shareholders through related party transactions (RPTs); instead, these transactions enhance value for minority shareholders. Conversely, in a study involving US listed public maritime shipping companies, Andrikopoulos, Merika, Merikas, and Sigalas (2021) provide evidence that the extent of RPTs (a proxy for conflicts between controlling and minority shareholders) positively affects these companies' profitability and financial leverage, while showing negative associations with their size, board size, and board member independence. These findings have significant implications for maritime shipping investors and capital market regulators. The evidence highlights the importance of addressing principal-principal agency conflicts through tailored governance strategies. In this context, specific governance mechanisms –such as board gender diversity– may play a key role in mitigating these conflicts.

4. Hypotheses development

The board of directors can play a key role in curbing the ability of controlling shareholders to expropriate the wealth of minority shareholders through the approval and oversight of critical decisions (Fama & Jensen, 1983). Given the challenges faced by minority shareholders in monitoring, and the favourable conditions for wealth diversion by controlling shareholders, the role of the board becomes particularly important in the Spanish context. However, it is crucial to recognize that, in such circumstances, board composition is often significantly influenced by controlling shareholders (Cuervo, 2002). As a result, examining the primary motivations that drive controlling shareholders to nominate female directors is essential if we are to gain a deeper insight into how the appointment of female directors might affect audit fees in this context. In this regard, when an owner controls a firm, they also dictate the policies for nominating and removing directors (Ben-Amar et al., 2013; García-Meca & Santana-Martín, 2023). In a similar vein, Hermalin and Weisbach (1998) argue that understanding the director selection process is essential for comprehending the functions the board can fulfil and how well it can execute them.

Initially, the selection of female directors actively engaged in supervisory roles might stem from controlling shareholders' intent to demonstrate their sincere dedication to long-term value creation and robust corporate governance practices. Consequently, it is not merely a matter of fulfilling a quota but of actively incorporating female directors into supervisory positions.

Existing evidence sheds light on the distinctive challenges and strengths female directors bring to the board. Acknowledging the complex obstacles they face, Kennedy and Schumacher (2005) highlight that women in leadership roles are often confronted with increased social inequality and external pressures, compelling them to exhibit outstanding oversight and monitoring capabilities. Research suggests that –when compared to their male counterparts– female directors are likely to impose more control over management. This translates into a deeper commitment to accountability and the demonstration of enhanced supervisory abilities, including effective communication and a collaborative management approach (Adams & Ferreira, 2009; Gul et al., 2008; Gul, Srinidhi, & Tsui, 2012; Srinidhi, Sun, Zhang, & Chen, 2020). Such capabilities lead to improved information environments and board effectiveness, even without a majority or other symbolic forms of power. Moreover, female directors are often characterized by a more ethical, cautious, and risk-aware decision-making style (Adams & Ferreira, 2009; Francis, Hasan, Wu, & Yan, 2014; Schubert, 2006). This perspective promotes a greater sense of responsibility in corporate contexts and is associated with better financial reporting quality, suggesting that boards with significant female presence are more likely to emphasize transparency, ethics, and accountability. Exploring the effects of gender diversity on board dynamics in the US, Adams and Ferreira (2009) reveal that female directors are more consistent in attending meetings than their male counterparts and contribute to a culture where male directors are less likely to skip meetings. Their involvement also increases the chances of women participating in oversight committees, indicating a higher level of commitment and engagement in governance tasks. Research further indicates that companies with diverse boards show a more significant response in CEO turnover to stock performance and a greater tendency to reward directors with equity, highlighting the impactful role of gender diversity in enhancing corporate governance and board functionality.

If female directors are considered to be scrupulous and thorough monitors (Adams & Ferreira, 2009; Bauer & Chytilová, 2013; Gul et al., 2008; Gul et al., 2012; Schwartz-Ziv, 2017; Srinidhi et al., 2020) and to contribute to effectively mitigating internal control risks (Chang, Hu, Liu, & Sue, 2020), they might therefore influence external auditor assessment of the internal control environment. This could lead to a reduction in audit effort and decrease both litigation and reputational risks for the auditor, potentially resulting in lower audit fees (supply perspective).

However, while audit fees might reflect auditor willingness to incorporate agency conflicts into audit pricing (supply perspective), they also mirror insider demands for audit quality (demand perspective). In this context –and as pointed out by Knechel and Willekens (2006)– the production function viewpoint assumes a constant demand for assurance that overlooks insiders' incentives to safeguard their own individual interests. If female directors are selected for their exceptional monitoring skills, this nomination might thus serve as a credible signal to external stakeholders of the dominant shareholder's genuine commitment to long-term value creation and effective corporate governance. This signalling mechanism confers undeniable advantages on these firms in contractual arrangements. In an environment where reputation plays a crucial role not only in market-based but also in relationship-based contracting (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000), and where controlling owners have reputational capital at stake, this signalling device may offer significant advantages to dominant shareholders, enhancing the company's overall reputation and improving its prospects in both market-driven and relationship-based contracting. This signal is credible as it might be costly to imitate for those controlling owners committed to expropriation and self-dealing activities.

Moreover, given that female directors who are nominated for their superior monitoring skills have substantial reputational capital at stake (Gilson, 1990; Godfrey, Hoepner, Lin, & Poon, 2020), they may be more inclined to increase their demands for audit coverage in order to strengthen their reputation as vigilant overseers once they have been appointed. By increasing the demands for audit coverage, female directors seek to protect their reputational capital, which not only safeguards their current board positions but also enhances their prospects for future appointments. In this specific context, greater audit coverage therefore provides benefits to both female directors and controlling owners alike. According to this demand perspective, female directors might therefore increase audit fees.

However, the appointment of female directors in this context may not be driven by any genuine controlling owner commitment to reduce agency conflict and enhance corporate governance but might represent a form of tokenism or "window dressing" that is aimed at meeting mandated quotas and deflecting external stakeholder attention away from these controlling shareholders' potentially questionable activities. In such a scenario, auditor assessment of the internal control environment could lead to increased audit fees due to heightened litigation and reputational risks (supply perspective). However, from a demand-based viewpoint, these appointments characterized by tokenism may afford limited influence to female directors in shaping audit policies, given the controlling shareholders' reluctance to allow their non-value-maximizing behaviours to be scrutinized. We thus anticipate an insignificant relationship between the presence of female directors and audit fees (demand perspective).

Building on these insights, the impact of female directors on audit fees becomes an empirical question. On the one hand, if female directors are selected by controlling owners due to their superior monitoring skills, the "supply" perspective will predict a negative relation between female directors and audit fees, while the "demand" hypothesis will predict a positive relation. Conversely, if the selection of female directors represents a form of tokenism or "window dressing", the supply perspective will predict a positive relation between female directors and audit fees, whereas the demand perspective will predict a non-significant relation.

We thus formulate the hypothesis as follows:

H1. *In a principal-principal agency conflict setting, female directors impact audit fees.*

5. Research design

5.1. Sample

The research draws on a sample of 105 Spanish non-financial listed firms from the OSIRIS database for the period 2012–2022, resulting in an unbalanced panel consisting of 975 firm-year observations. These firms represent 99.2 % of the Spanish market capitalization as of 2022. To mitigate the influence of extreme values which might skew our analysis, we employ a winsorizing technique at the 1st and 99th percentiles.

5.2. Variables

5.2.1. Audit fees

In line with previous literature (Carcello, Hermanson, Neal, & Riley Jr, 2002; Ittonen et al., 2010; Johl, Khan, Subramaniam, & Muttakin, 2016; Lai et al., 2017; Nekhili et al., 2020), we analyse the amount paid for audit services through the variable *Audit_fees*, measured as the natural logarithm of audit fees.

5.2.2. Women directors

We examine the presence of female directors through two variables: *GD_Board*, which is the percentage of women directors on the board (Fernández-Méndez & Pathan, 2023; Lai et al., 2017; Nekhili et al., 2020), and *GD_AuditCom,* which is the percentage of women directors in the audit committee (Ittonen et al., 2010; Miglani & Ahmed, 2019).

5.2.3. Control variables

Consistent with prior research, in order to take into account other firm characteristics that might affect audit fees we include a number of control variables: *Size*, denotes firm size, measured as the natural logarithm of total assets. Larger companies undertake more transactions, such that a greater effort is required by auditors, thereby resulting in higher audit fees (Fernández-Méndez & Pathan, 2023; Gul et al., 2008; Nekhili et al., 2020); *ROA* is the return-on-assets ratio, computed as earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by total assets. The relationship between firm profitability and audit fees is unclear. On the one hand, more profitable firms are more likely to be willing to pay higher audit fees. However, auditors might perceive lower risk in more profitable firms, thus providing an incentive to pay less for audit services (Nekhili et al., 2020; Sellami & Cherif, 2020; Simunic, 1980); *Age* denotes firm maturity, calculated as the natural logarithm of one plus the number of years since they were incorporated. We expect a negative impact of firm age on audit fees, as more mature firms tend to have more pronounced internal control systems (Ettredge, Fuerherm, & Li, 2014; Schierstedt & Corten, 2021). *Debt* represents the firm's leverage, calculated as the ratio of the sum of short and long-term debt to total assets. Here, a positive influence is expected as the likelihood of the client facing financial difficulties reveals a higher level of risk and requires greater auditing effort (Fernández-Méndez & Pathan, 2023; Huang et al., 2014; Lai et al., 2017; Nekhili et al., 2020; Zaman, Hudaib, & Haniffa, 2011; Zhang, 2018); *Board* indicates board size, measured as the natural logarithm of the total number of directors. A greater number of board directors is expected to be associated with lower business performance and inefficiencies in decision making. Audit firms thus consider larger boards to be riskier, resulting in higher audit fees (Bliss, 2011; Nekhili et al., 2020); *CEO_Duality* reflects the leadership structure, and is a dummy variable that equals one if the CEO is also the chair of the board, and zero otherwise. The dual role of the chair reduces the board's control capacity, thereby increasing the efforts of the external auditor and, consequently, the fees (Bliss, Muniandy, & Majid, 2007; Huang et al., 2014; Lai et al., 2017); *Voting* indicates ownership concentration, measured as the largest shareholder's percentage of voting rights. The relationship here is unclear, as ownership concentration increases access to private information channels, which reduces the relevance of audit services (Barroso, Ben Ali, & Lesage, 2018; Nekhili et al., 2020). However, the presence of controlling owners generates conflicts with minority shareholders, which may incentivise greater auditing efforts in order to reduce information asymmetries (Schierstedt & Corten, 2021); *Complex* is a measure of audit complexity, which results in higher audit fees, and is calculated as the ratio of inventories and receivables to the firm's assets (Ho & Kang, 2013; Miglani & Ahmed, 2019; Schierstedt & Corten, 2021). The model includes year and industry fixed effects to control for invariant characteristics over time and across industries, respectively.

5.3. Estimation models

Our empirical investigation begins with a descriptive analysis, followed by the application of several regression models to address the relationship between audit fees and the proportion of female directors on corporate boards. We initially employ OLS regressions, including year and industry fixed effects. Moreover, to account for intra-firm correlation, standard errors are clustered by firm. We estimate the following basic empirical model:

$$\begin{aligned} Audit\_fees_{it} = {} & \propto_0 + \propto_1 GD_{it} + \propto_2 Size_{it} + \propto_3 ROA_{it} + \propto_4 Age_{it} + \propto_5 Debt_{it} \\ & + \propto_6 Board_{it} + \propto_7 CEO\_Duality_{it} + \propto_8 Voting_{it} \\ & + \propto_9 Complex_{it} + \partial_t + \gamma_j + \varepsilon_{it} \end{aligned}$$

In order to bolster the integrity of the analysis, we conduct three-stage least squares (3SLS) estimation. This approach allows us to simultaneously estimate multiple equations where endogenous variables are determined within the system, thereby controlling for reverse causality. This is particularly relevant when considering that firms with greater audit quality may signal their transparency by appointing female directors, which could lead to a mistaken conclusion that these firms had ex-ante superior audit quality.

The simultaneous equations system for the 3SLS model is as follows:

$$\begin{aligned} Audit\_fees_{it} = {} & \propto_0 + \propto_1 GD_{it} + \propto_2 Size_{it} + \propto_3 ROA_{it} + \propto_4 Age_{it} + \propto_5 Debt_{it} \\ & + \propto_6 Board_{it} + \propto_7 CEO\_Duality_{it} + \propto_8 Voting_{it} \\ & + \propto_9 Complex_{it} + \partial_t + \gamma_j + \varepsilon_{it} \end{aligned} \tag{1}$$

$$\begin{aligned} GD_{it} = {} & \propto_0 + \propto_1 Audit\_fees_{it} + \propto_2 Size_{it} + \propto_3 ROA_{it} + \propto_4 Age_{it} + \propto_5 Debt_{it} \\ & + \propto_6 Board_{it} + \propto_7 CEO\_Duality_{it} + \propto_8 Voting_{it} + \propto_9 Complex_{it} \\ & + \partial_t + \gamma_j + \varepsilon_{it} \end{aligned} \tag{2}$$

To test the robustness of our results, we use four additional estimators. These estimators are designed to address endogeneity issues –particularly those arising from possible selection biases or the omission of unobservable firm characteristics. Such factors might influence the appointment of female directors.

To ensure comparability between our treatment and the benchmark group in observable covariates, we conduct audit fee analysis using a regression framework that incorporates propensity score matching (PSM). Specifically, we match firms with female directors to those without –based on nearest neighbour and observable characteristics– in order to address potential selection bias. To calculate the propensity score, we use the instrumental variable "Men_Linked_Women", defined as the fraction of board members connected to at least one female director on other boards. This choice is based on research which suggests that female executive visibility in corporate networks, or the lack thereof, significantly impacts their board representation (Adams & Ferreira, 2009; Chen, Leung, & Goergen, 2017; Griffin, Li, & Xu, 2021; Levi, Li, & Zhang, 2014). Hence, companies' director connectivity to female board members elsewhere indicates a greater likelihood of having female directors, emphasizing a positive correlation.

Additionally, to further mitigate sample selection bias, we implement Heckman's two-stage correction model. In the first stage, we determine the likelihood of a firm having a female director through a probit model, using the instrumental variable to estimate the lambda coefficient or non-selection risk (inverse Mills ratio). In the second stage, we incorporate the lambda coefficient into our main regression model.

$$\begin{aligned} Audit\_fees_{it} = {} & \propto_0 + \propto_1 GD_{it} + \propto_2 Size_{it} + \propto_3 ROA_{it} + \propto_4 Age_{it} + \propto_5 Debt_{it} \\ & + \propto_6 Board_{it} + \propto_7 CEO\_Duality_{it} + \propto_8 Voting_{it} \\ & + \propto_9 Complex_{it} + \propto_{10} IMR_{it} + \partial_t + \gamma_j + \varepsilon_{it} \end{aligned}$$

Female appointments might also be influenced by exogenous factors that in turn influence audit fees. In order to alleviate such endogeneity problems, we first use the two-stage least squares estimator (2SLS). As an instrumental variable we use the variable *Men_Linked_Women*. The system of simultaneous equations is as follows:

$$\begin{aligned} GD\_Estimated_{it} = {} & \propto_0 + \propto_1 Male\_Linked\_Women_{it} + \propto_2 Size_{it} + \propto_3 ROA_{it} \\ & + \propto_4 Age_{it} + \propto_5 Debt_{it} + \propto_6 Board_{it} + \propto_7 CEO\_Duality_{it} \\ & + \propto_8 Voting_{it} + \propto_9 Complex_{it} + \partial_t + \gamma_j + \varepsilon_{it} \end{aligned} \tag{3}$$

$$\begin{aligned} Audit\_fees_{it} = {} & \propto_0 + \propto_1 GD\_Estimated_{it} + \propto_2 Size_{it} + \propto_3 ROA_{it} + \propto_4 Age_{it} \\ & + \propto_5 Debt_{it} + \propto_6 Board_{it} + \propto_7 CEO\_Duality_{it} + \propto_8 Voting_{it} \\ & + \propto_9 Complex_{it} + \partial_t + \gamma_j + \varepsilon_{it} \end{aligned} \tag{4}$$

Finally, we estimate the main regressions by employing Blundell and Bond's (1998) Generalized Method of Moments (GMM). Using this technique enables us to deal with endogeneity problems, given that the firm endogenously determines both the number of female board directors and audit fees. This leads to certain issues that emerge as a result of omitted unobservable firm characteristics, and which might impact the possible appointment of women directors. For instance, when exploring the impact of board diversity on audit fees, corporate culture (which is not observable) might play a key role in the sense that companies who pay higher audit fees may retain more women directors. GMM thus enables us to address potential endogeneity problems by using as instruments the variables on the right-hand side of the model lagged one to four times (and two to five times for the lag of audit fees). The only exceptions are the year effects variables, which are considered exogenous. More specifically, we use the two-step system GMM estimation included in the Stata routine set xtabond2 developed by Roodman (2009). The two-step estimation estimates the regression with heteroscedasticity-robust standard errors.

6. Results

6.1. Sample distribution

Figs. 1 and 2 illustrate the distribution of the main variables of interest in our study. Initially, we examine the audit fees paid by companies, the presence of at least one woman in the boardroom, and the proportion of women among board directors. Fig. 1 specifically depicts the growth of audit fees from 2012 to 2022.

Additionally, as regards female directors, Fig. 2 shows that the number of boards with at least one woman increased from 72.38 % in 2012 to 98.1 % in 2022. However, the increase is less pronounced when considering the overall percentage of female directors, which only rose from 16.26 % to 31.75 % over the same period. These findings indicate that while the presence of women on Spanish company boards has gradually increased, their overall representation remains relatively low.

6.2. Descriptive statistics

Table 1 offers descriptive statistics for all the variables under study. Panel A provides a summary of these statistics for the variables used in our estimation models. Data show that audit fees come to an average of 321,000 euros.[1] Regarding gender diversity, women hold approximately 19 % of board seats and about 40 % of positions on the audit committee. Regarding firm characteristics, the average profitability is 5.33 %, with an average firm age of 52 years and leverage of around 70 %. The average board size is 10 members, and about half of the CEOs also serve as executive directors. Lastly, the main shareholder controls approximately one third of the shares.

Panel B presents the correlation matrix for all variables. The low correlation observed among key variables suggests that multicollinearity is unlikely to significantly influence our regression results, a conclusion supported by the low Variance Inflation Factor (VIF) values (Studenmund, 1997).

In addition, we conducted a mean difference analysis as an initial step towards examining the relationship between gender diversity and audit fees. Companies were categorized into two groups based on the presence or absence of female board members (as detailed in Panel C). Results indicate that companies with female board members tend to pay higher audit fees. Moreover, these companies are generally larger (*Size*), more profitable (*ROA*), have a greater number of board members (*Board*), issue less debt (*Debt*), experience less complexity in external audit processes (*Complex*), and exhibit less concentrated ownership (*Voting*). However, the analysis revealed no statistically significant differences in firm age (*Age*) or in the executive nature of the board chair (*CEO_Duality*). These findings highlight the need for further investigation into how female directors influence audit fees.

6.3. Board gender diversity and audit fees

Table 2 (Panel A) displays Models 1 and 2, showing the estimated relationship between audit fees and board gender diversity, using OLS regression. Across both models, we see that board gender diversity has a positive and significant influence on audit fees. These findings align with two alternative explanations. The first suggests an increase in female directors' demands for audit quality, indicating that controlling owners select female directors for their superior monitoring skills to signal genuine commitment to effective corporate governance (demand perspective). The second explanation is supply-based and indicates an increase in both litigation and reputational risk for the auditor. This suggests that the selection of female directors might signify tokenism or "window dressing" (supply perspective). In models 3 and 4 (Panel B), we present estimations with lagged independent and control variables, and the results remain consistent with our previous findings.

The results from the 3SLS estimation of the simultaneous equations system are presented in Table 3, covering Models 5 and 6. Model 5 designates *Audit_fees* as the dependent variable for Eq. (1), and *GD_Board* as the dependent variable for Eq. (2). These equations account for both the main explanatory variables and control variables. Eq. (1) in Model 5 reveals a positive and statistically significant relationship between board gender diversity and audit fees. On the other hand, audit fees do not appear to significantly affect board gender diversity, as shown in Eq. (2). This observation lends support to the absence of reverse causality between board gender diversity and audit fees. To verify the reliability of our findings, Model 6 examines the effect of female directors on the audit committee. The conclusions of Model 6 are consistent with those of Model 5, thus strengthening our results.

Models 7 to 14 in Table 4 display the estimated relationship between audit fees and board gender diversity, using PSM, Heckman, 2SLS and GMM methodologies. Across all models, we observe that board gender diversity has a positive and significant influence on audit fees. In Models 7 and 8, we apply the PSM method in which we use a matched sample to control for observable firm characteristics. Alternatively, to control for selection bias in board diversity, in Models 9 and 10, we use the Heckman Model in two stages. In the first stage, we calculate the inverse Mills ratio based on a model that predicts diversity probability. For this, we define the variables *DGD_Board* and *DGD_AuditCom* as dichotomous variables that take the value one when there is at least one woman on the board of directors or on the audit committee, and zero otherwise, respectively. In the second stage, we introduce the inverse Mills coefficient predicted by the probabilistic model into the original regression model as a control variable. Results indicate that the coefficient of the inverse Mills' ratio is not significant, implying there is no sample-selection bias. Finally, Models 11 and 12 show the results when using 2SLS and Models 13 to 14 display the results of the GMM method. In both cases the coefficients are similar to those obtained previously. To verify the consistency of the GMM estimates, two tests were conducted. First, the Hansen test validates the instruments employed in the GMM regressions. Secondly, the M2 test confirms the absence of second-order autocorrelation in these regressions. Lastly, we conducted Wald tests to assess the joint significance of the coefficients in question (Z1), the time dummy variables (Z2), and the sectoral dummy variables (Z3). Although we cannot completely rule out all endogeneity problems, the results of our five endogeneity tests confirm the main findings. We therefore conclude, other things being equal, greater board diversity is associated with a higher marginal level of audit fees.

In terms of control variables, firm size (Size) shows a positive impact on audit fees, with larger firms tending to engage in a greater number of transactions, which implies additional effort on the part of auditors and, therefore, higher expected fees (Fernández-Méndez & Pathan, 2023; Gul et al., 2008; Nekhili et al., 2020). Furthermore, the level of indebtedness (*Debt*) increases audit fees, since a higher probability of financial distress implies greater risk and thus a more thorough audit (Fernández-Méndez & Pathan, 2023; Huang et al., 2014; Lai et al., 2017; Nekhili et al., 2020; Zaman et al., 2011; Zhang, 2018). Ownership concentration (*Voting*) also has a positive impact on audit fees, since the presence of controlling shareholders can generate conflicts arising from discrepancies with

[1] Data related to audit fees, firm age, and board size are not shown in logarithmic form for ease of understanding.

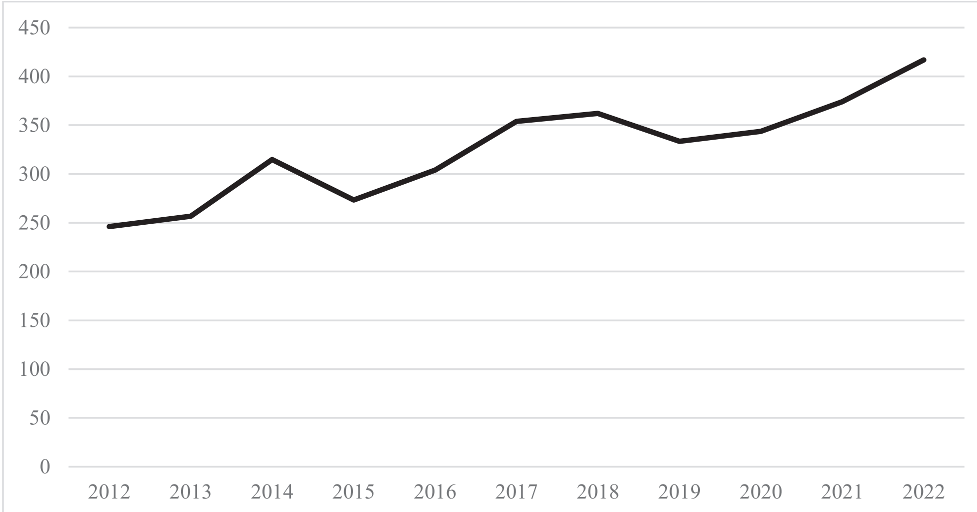

Fig. 1. Average annual audit fees.

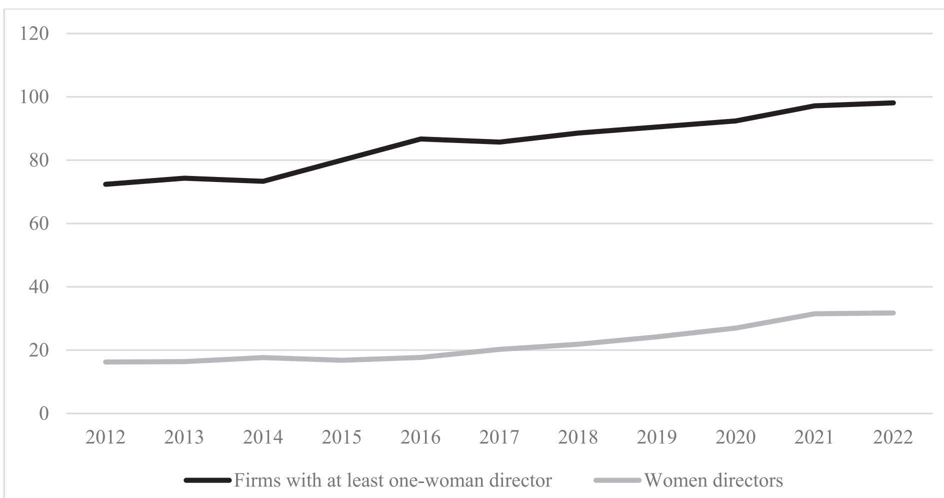

Fig. 2. Board gender diversity.

minority shareholders, which motivates greater audit efforts to reduce information asymmetries and, therefore, agency conflicts (Schierstedt & Corten, 2021). In contrast, firm age is negatively related to external audit fees, suggesting that more established firms tend to have stronger and more developed internal control systems, which reduces audit complexity (Ettredge et al., 2014; Schierstedt & Corten, 2021). The number of board members (*Board*), profitability (ROA), the dual role of the CEO (*CEO_Duality*) and audit complexity (*Complex*) do not seem to have a significant influence on external audit fees.

6.4. Appointing a BIG4 audit firm

Our findings are consistent with two alternative explanations. The first implies a rise in the demand for audit quality by female directors, suggesting that controlling owners choose them for their superior monitoring abilities in order to demonstrate genuine dedication to effective corporate governance (demand perspective). The second explanation is supply-oriented, and points to an increase in both litigation and reputational risk for auditors. This implies that appointing female directors might represent mere tokenism or "window dressing" (supply perspective).

In order to disentangle whether the resulting audit fees reflect genuine commitment to effective corporate governance or, conversely, whether they are induced by tokenism or window dressing motives, we now look at patterns of auditor selection in conjunction with the presence of female directors. Previous studies have established a positive correlation between the quality of audit work and the size of the audit firm (Bauwhede, Willekens, & Gaeremynck, 2003; Choi, Kim, Kim, & Zang, 2010; DeFond & Zhang, 2014; Francis & Wang, 2008; Kausar, Shroff, & White, 2016; Krishnan, 2003; Pae & Yoo, 2001). Under this perspective, selecting an auditor from one of the Big4 firms –Deloitte Touche Tohmatsu, Ernst & Young, KPMG, or PricewaterhouseCoopers– might enhance audit quality.

If companies with female board members are more inclined to appoint Big4 audit firms, our results might therefore be interpreted as supporting the demand perspective. According to this view, selection of a reputable audit firm is a strategic decision reflecting a genuine commitment to transparency and effective corporate governance. Conversely, if firms with female directors are less inclined to appoint a Big4 audit firm, our results might mainly be driven by supply factors, possibly explained by tokenism or window-dressing.

Table 5 presents Models 15 and 16, with the dependent variable being the appointment of a Big4 audit firm. The results from both models align with the notion that female directors prefer to select a Big4

Table 1
Descriptive statistics.

Panel A. Summary statistics

	Mean	*Median*	*SD*	*Min.*	*Max.*	*1°Q*	*3°Q*
Audit_fees	321.32	125.00	615.17	9.00	3600.00	55.79	251.00
GD_Board	18.99	18.18	13.72	0.00	50.00	9.09	28.57
GD_AuditCom	37.92	33.33	16.21	0.00	75.00	25.00	50.00
Size	14.04	14.04	2.08	9.55	18.60	12.53	15.32
ROA	5.33	5.00	11.11	−32.68	60.99	1.98	8.64
Age	51.62	45.00	30.20	4	143	28.00	74.00
Debt	67.23	66.55	28.43	15.86	94.87	48.87	80.95
Board	10.20	10.00	3.08	5.00	18.00	8.00	12.00
CEO_Duality	0.54	1.00	0.49	0.00	1.00	0.00	1.00
Complex	1.14	0.20	5.36	0.08	29.64	0.47	0.53
Voting	34.01	28.00	23.39	0.823	90.00	14.87	52.00

Panel B. Correlation matrix

	Audit_fees	*GD_Board*	*GD_AuditCom*	*Size*	*ROA*	*Age*	*Debt*	*Board*	*CEO_Duality*	*Complex*
GD_Board	0.21***									
GD_AuditCom	0.225***	0.609***								
Size	0.66***	0.19***	0.267***							
ROA	0.01	0.02	0.061*	−0.009						
Age	0.22***	−0.01	0.068**	0.11***	−0.03					
Debt	0.15***	−0.04*	−0.017	0.07**	−0.26***	0.07**				
Board	0.42***	0.05	0.174***	0.66***	0.02	0.09**	−0.01			
CEO_Duality	0.03	−0.01	0.011	0.02	0.08**	0.10***	−0.04	0.02		
Complex	−0.19***	−0.09***	−0.061	−0.28***	−0.03	−0.10**	−0.02	−0.20***	−0.12***	
Voting	−0.16***	−0.03	−0.161***	−0.13***	−0.01	−0.16***	−0.003	−0.30***	−0.06**	0.009
			Size	*Board*	*ROA*	*Debt*	*Age*	*CEO_Duality*	*Complex*	*Voting*
VIF			2.02	2.01	1.08	1.10	1.06	1.03	1.12	1.15

Panel C. Firms with and without female directors

	Firms with female directors $N = 806$			Firms without female directors $N = 169$			
	Mean	*Median*	*SD*	*Mean*	*Median*	*SD*	*t-Student*
Audit_fees	4.91	4.95	1.27	4.35	3.58	1.09	6.00***
Size	14.30	14.35	2.08	12.82	11.77	1.59	8.70***
ROA	5.90	5.27	10.55	2.37	3.91	13.09	3.82***
Age	51.55	45.00	30.49	51.91	45.00	30.49	0.14
Debt	66.00	65.80	28.26	73.10	70.56	28.59	−2.96***
Board	2.31	2.39	0.29	2.07	2.08	0.36	9.51***
CEO_Duality	0.53	1	0.49	0.55	1	0.49	−0.43
Complex	0.90	0.17	4.66	2.31	0.41	7.81	−3.12***
Voting	33.01	26.70	22.88	38.70	29.90	25.22	−2.88***

*, **, *** indicate significant at 10 %, 5 %, 1 %, respectively.

auditor. We interpret this consistency as evidence supporting the demand-side explanation, indicating that female directors play a significant role in corporate governance by increasing their demands for audit quality in the considered setting.

6.5. Further analysis

6.5.1. The moderating role of the controlling owner's voting-cash flow wedge in the female director-audit fee relation

As shown earlier, our findings reveal that female directors increase demands for audit quality. This suggests that controlling owners select female directors for their superior monitoring skills rather than as tokenism or "window-dressing" so as to provide a credible signal of the controlling shareholders' commitment to effective corporate governance. This significance is particularly notable in a context where principal-principal agency conflict prevails and where gender quotas –although backed by legislation– enforce lighter penalties for non-compliance.

To further reinforce our main findings, we examine whether female directors are more likely to strengthen their supervisory role by increasing their demands for audit quality in the presence of structures that enable a divergence between the voting and cash flow rights of the controlling owner. We therefore examine the moderating role of the controlling owner's voting-cash flow wedge on the relationship between female directors and audit fees. This wedge intensifies agency conflicts between controlling and minority shareholders because it allows controlling owners to obtain private benefits while avoiding proportional economic consequences for their decisions (Bebchuk, Kraakman, & Triantis, 2000; La Porta et al., 1999; Shleifer & Vishny, 1997).

Models 17 and 18 (as shown in Table 6) incorporate the variable "Pyramids", measured as a dummy variable that takes the value one when the dominant owner has higher voting rights than cash flow rights, and zero otherwise, to analyse the moderating effect of the controlling owner's voting-cash flow wedge on the relationship between audit fees and board gender diversity. Our findings reveal a negative impact of the controlling owner's voting-cash flow wedge on audit fees, while the presence of female directors is associated with a positive effect on audit fees. Additionally, the interaction term between female directors and the

Table 2
Board gender diversity and audit fees (Fixed effects).

Panel A. Non- lagged variables		
Dependent variable	*Audit fees*	
	Model 1	Model 2
GD_Board	0.010***	
	(4.15)	
GD_AuditCom		0.002***
		(2.58)
Size	0.424***	0.333***
	(18.69)	(8.22)
Board	0.246*	0.182
	(1.76)	(1.38)
ROA	0.004	0.001
	(0.61)	(0.55)
Debt	0.044***	0.005***
	(3.83)	(3.72)
Age	−0.173***	−0.076
	(−3.58)	(−0.69)
CEO_Duality	0.096	0.038
	(1.59)	(0.66)
Complex	0.001	0.001
	(1.21)	(1.02)
Voting	0.001	0.001
	(0.86)	(1.25)
Constant	−2.117***	−1.487**
	(−5.57)	(−2.17)
Industry effect	*Yes*	*Yes*
Year effect	*Yes*	*Yes*
F test	42.56***	37.51***
R-squared	0.58	0.58
No. of observations	975	975

Panel B. Lagged variables		
Dependent variable	*Audit fees*	
	Model 3	Model 4
GD_Board	0.009**	
	(1.83)	
GD_AuditCom		0.003*
		(1.819
Size	0.422***	0.0403***
	(7.37)	(13.17)
Board	−0.226	−0.098
	(−0.80)	(−0.53)
ROA	−0.0007	0.0009
	(−0.17)	(0.23)
Debt	0.170	0.004***
	(1.65)	(2.76)
Age	0.087	0.086
	(0.74)	(1.42)
CEO_Duality	0.087	0.178**
	(0.74)	(1.98)
Complex	0.01	0.0009
	(1.12)	(1.15)
Voting	−0.001	−0.001
	(−0.60)	(−0.81)
Constant	−2.045***	−1.28***
	(−2.70)	(−2.35)
Industry effect	*Yes*	*Yes*
Year effect	*Yes*	*Yes*
F test	16.09***	42.33***
R-squared	0.60	0.46
No. of observations	975	975

*, **, *** indicate significant at 10 %, 5 %, 1 %, respectively.
Standard errors are clustered by firm.

controlling owner's voting-cash flow wedge is significantly positive. These results align with our expectations and highlight the benefits of signalling through the selection of female directors based on their monitoring skills, particularly as the controlling owner's voting-cash flow wedge and associated agency conflicts increase.

Table 3
Board gender diversity and audit fees (3SLS).

Dependent variables	*Audit fees (Eq. (1))*	*GD_Board (Eq. (2))*	*Audit fees (Eq. (1))*	*GD_AuditCom (Eq. (2))*
	Model 5		Model 6	
GD_Board	0.009***			
	(4.51)			
GD_AuditCom			0.005***	
			(3.94)	
Audit fees		0.653		2.629
		(0.86)		(1.56)
Size	0.411***	2.491***	0.406***	1.706**
	(19.72)	(4.50)	(19.01)	(2.09)
Board	0.169	0.194	0.193	0.353
	(1.31)	(0.60)	(1.49)	(0.12)
ROA	0.001	0.088	0.001	0.083
	(0.50)	(1.40)	(0.50)	(1.31)
Debt	0.004***	−0.025	0.004***	−0.034
	(4.16)	(−0.99)	(3.89)	(−1.28)
Age	−0.005***	0.016	−0.005***	0.006
	(−5.82)	(0.68)	(−5.56)	(0.24)
CEO_Duality	0.077	0.772	0.071	0.585
	(1.37)	(0.56)	(1.25)	(0.42)
Complex	0.007	0.001	0.005	0.001
	(1.25)	(1.12)	(0.86)	(0.75)
Voting	−0.001	−0.177***	−0.001	−0.171***
	(−1.01)	(−5.58)	(−0.93)	(−5.38)
Constant	−1.605***	−24.669***	−1.407***	−22.565***
	(−5.25)	(−3.72)	(4.58)	(−3.28)
Industry effect	*Yes*	*Yes*	*Yes*	*Yes*
Year effect	*Yes*	*Yes*	*Yes*	*Yes*
Wald Chi^2 Audit fees	1343.20***		1297.56***	
Wald Chi^2 GD_Board		245.42***		
Wald Chi^2 GD_AuditCom				247.86***
No. of observations	975	975	975	975

*, **, *** indicate significant at 10 %, 5 %, 1 %, respectively.
Standard errors are clustered by firm.

6.5.2. *The moderating role of COVID-19 in the female director-audit fee relation*

The COVID-19 pandemic brought new challenges for auditors, reflected in increased effort and delay in audit reporting. In addition, it posed a significant challenge for firms due to the uncertainties as well as operational and financial issues arising from lockdowns. In this context, the pandemic may have led to an increase in audit fees, as auditors pass on the higher cost to their clients (Harjoto & Laksmana, 2023; Hategan, Pitorac, & Crucean, 2022). However, the difficulties associated with the health crisis may also have incentivised firms to pressure auditors to reduce their fees (Chen, Krishnan, & Yu, 2018; Krishnan & Zhang, 2014). In Table 7, we analyse the moderating effect of COVID-19 on the relationship between board gender diversity and audit fees. We define the variable COVID as a dichotomous variable that takes the value one in 2020, and zero otherwise. Models 19 and 20 show a negative and significant impact of COVID-19 on audit fees, in accordance with firms' demand perspective. However, the interaction between gender diversity and the health pandemic is positive and significant. This result concurs with the greater control associated to female directors, especially during a period of uncertainty.

7. Discussion of results and conclusions

Some previous studies have investigated the impact of female directors on audit fees (Aldamen et al., 2018; Alkebsee et al., 2021; Fernández-Méndez & Pathan, 2023; García-Meca et al., 2022; Gul et al., 2008; Gul et al., 2021; Harjoto et al., 2015; Huang et al., 2014; Ittonen et al., 2010; Lai et al., 2017; Miglani & Ahmed, 2019; Nekhili et al., 2020; Sellami & Cherif, 2020). However, findings from these studies are

Table 4
Board gender diversity and audit fees.

Dependent variable	*Audit fees*							
	Model 7 (PSM)	Model 8 (PSM)	Model 9 (Heckman)	Model 10 (Heckman)	Model 11 (2SLS)	Model 12 (2SLS)	Model 13 (GMM)	Model 14 (GMM)
GD_Board	0.727*		0.112***		0.988***		0.443**	
	(1.79)		(3.23)		(2.92)		(2.54)	
GD_AuditCom		0.349*		0.546**		0.355**		0.451***
		(2.09)		(2.18)		(2.00)		(4.77)
Size	0.386***	0.398***	0.403***	0.395***	0.412***	0.314***	0.413***	0.379***
	(12.14)	(15.65)	(16.75)	(14.34)	(17.29)	(4.56)	(17.79)	(17.98)
Board	0.002	0.103	0.086	0.175	0.160	0.090	0.063	0.437***
	(0.20)	(1.00)	(0.48)	(0.89)	(1.21)	(0.46)	(1.41)	(3.96)
ROA	0.001	0.002	0.003	0.001	0.004	0.005*	0.005***	0.008
	(0.46)	(1.09)	(0.99)	(0.32)	(0.19)	(1.92)	(9.75)	(0.88)
Debt	0.007***	0.005***	0.004***	0.003*	0.004***	0.008**	0.005***	0.001**
	(5.27)	(4.43)	(3.37)	(1.87)	(5.46)	(2.14)	(9.25)	(2.32)
Age	−0.005***	−0.005***	−0.005***	−0.006***	−0.005***	−0.005***	−0.001	−0.002*
	(−4.14)	(−6.74)	(−4.97)	(−4.75)	(−6.86)	(−5.13)	(−1.31)	(−1.89)
CEO_Duality	0.064	0.109	0.068	0.193**	0.509	0.065	0.063***	0.353***
	(0.69)	(1.52)	(0.98)	(2.41)	(1.10)	(0.89)	(3.13)	(7.06)
Complex	0.005**	0.002	0.006	0.002	0.004**	0.002	0.004***	0.002
	(1.99)	(1.10)	(0.79)	(0.33)	(2.09)	(0.50)	(4.83)	(1.52)
Voting	0.003*	0.004***	0.002*	0.004**	0.008	0.002	0.003	0.002***
	(1.84)	(3.02)	(1.68)	(2.41)	(0.76)	(0.13)	(0.50)	(2.80)
λ (IMR)			0.171	0.102				
			(0.92)	(0.52)				
Constant	−1.009**	−0.982**	−1.444***	−0.877*	−1.592***	−0.773*	−2.044***	−1.189
	(−2.28)	(−2.68)	(−3.36)	(−1.87)	(−5.91)	(−1.74)	(−4.92)	(−3.91)
Industry effect	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year effect	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
			First estimation					
Dependent variable			*DGD_Board*	*DGD_AuditCom*	*GD_Board*	*GD_AuditCom*		
Men_Linked_Women			0.036***	0.012***	0.185***	0.171***		
			(5.90)	(3.07	(5.38)	(2.67)		
Control variables					Yes	Yes		
Industry effect			*Yes*	*Yes*	*Yes*	*Yes*		
Year effect			*Yes*	*Yes*	*Yes*	*Yes*		
F test	49.53***	398.28***			130.67***	47.43***	285.28***	119.10***
Wald test			653.07***	435.09***				
Hansen Test							74.24	139.48
M2							−0.62	−1.03
Z1							74.20***	98.93***
Z2							36.90***	32.90***
Z3							79.53***	46.58***
No. of observations	334	334	975	975	975	975	975	975

*, **, *** indicate significant at 10 %, 5 %, 1 %, respectively.
Standard errors are clustered by firm.

not conclusive and have major gaps in our understanding of the specific mechanisms by which female directors may affect audit policies. Moreover, most empirical evidence focuses on contexts with diffuse ownership structures and explores the role of female directors in mitigating the classic agency conflict arising from the separation between ownership and control (Type I Agency conflict). As a result, specific examination of the role of female directors in mitigating Type II agency conflicts through the audit process –particularly in the context of gender quotas included in legal mandates that impose softer sanctions for non-compliance– remains largely unexplored.

Our initial findings are consistent with two alternative explanations. The first implies a rise in the demand for audit quality by female directors, suggesting that controlling owners choose them for their superior monitoring skills to signal genuine commitment to effective corporate governance (demand perspective). The second explanation is supply-oriented, and points to an increase in both litigation and reputational risks for the auditor. This implies that appointing female directors might represent tokenism or “window dressing” (supply perspective).

Further analysis shows that female directors in the considered context actively promote the appointment of Big4 audit firms, which allows us to disentangle these alternative explanations, in support of the demand hypothesis. Our findings suggest an increase in the demand for audit quality among female directors, indicating that controlling owners select them for their superior monitoring skills to signal their genuine commitment to effective corporate governance (demand perspective). In-depth analysis reveals that, as the controlling owner’s voting-cash flow wedge –and consequently Type II agency conflict– intensifies, female directors are more likely to strengthen their supervisory role by increasing their demands for audit quality. In this way, female directors contribute towards effective corporate governance by protecting minority shareholder interests. This interpretation provides additional robustness to our primary results, with the findings proving robust against potential endogeneity bias.

Contrary to studies which suggest that audit fees are primarily supply-driven (Alkebsee et al., 2021; Garcia-Blandon et al., 2023; Gull et al., 2021; Harjoto et al., 2015; Ittonen et al., 2010; Nekhili et al., 2020), our results align with a demand-side view that connects female directors to audit fees. The distinctive characteristics of the Spanish institutional setting, such as lower investor protection, reduced litigation risk, and the presence of competitive audit markets, might provide lower incentives for auditors to incorporate agency conflicts into audit pricing –the supply perspective. Conversely, in this weaker litigation environment, auditors would choose to accommodate their clients’

Table 5
Association between board gender diversity and the Big 4. (IV Probit).

Dependent variable	*Big4*	
	Model 15	Model 16
GD_Board	0.278**	
	(2.01)	
GD_AuditCom		0.312***
		(3.57)
Size	0.582***	0.444***
	(5.31)	(3.87)
Board	0.833**	0.791**
	(2.14)	(2.14)
ROA	0.009*	0.005
	(1.67)	(0.95)
Debt	0.014***	0.012***
	(4.27)	(4.00)
Age	−0.007	−0.001
	(−0.26)	(−0.70)
CEO_Duality	0.239	0.207
	(1.20)	(0.38)
Complex	0.001	0.003
	(1.09)	(0.38)
Voting	0.010***	0.006*
	(2.83)	(1.75)
Constant	−7.877***	−6.406***
	(−4.74)	(−3.90)
Industry effect	*Yes*	*Yes*
Year effect	*Yes*	*Yes*
Wald χ^2	72.77***	93.67***
Log Likelihood	−3837.90	−4363.86
Wald test exogeneity	6.39**	4.55**
No. of observations	975	975

*, **, *** indicate significant at 10 %, 5 %, 1 %, respectively.
Standard errors are clustered by firm.

needs –the demand perspective (Hwang & Chang, 2010).

Our results complement studies that evidence a demand-driven relation between female directors and audit fees (Aldamen et al., 2018; Fernández-Méndez & Pathan, 2023; Gul et al., 2008; Lai et al., 2017; Miglani & Ahmed, 2019; Sellami & Cherif, 2020) by showing that female directors help to mitigate Type 2 agency conflict. Furthermore, our findings contrast with those of Nekhili et al. (2020) in the French context. While previous authors' results are consistent with a supply-side perspective, our findings consider the signalling role of female directors. One major difference between the two studies lies in the nature of the gender-diverse quota. Unlike in Spain, in the French context, non-compliance entails severe sanctions. Therefore, our analysis allows for a signalling rationale linked to the appointment of female directors, which is difficult to translate to a context where the appointment of female directors is not a voluntary decision adopted by firms, and where regulators might severely punish firms if they do not comply with the quota.

Our study offers several contributions. Firstly, it extends our understanding of how specific corporate governance mechanisms –such as board composition– impact audit fees. In doing so, it builds upon the existing body of research that has explored this relationship (Bedard & Johnstone, 2004; Carcello et al., 2002; Carcello, Hollingsworth, & Neal, 2006; Chan, Liu, & Sun, 2013; Drogalas, Nerantzidis, Mitskinis, & Tampakoudis, 2021; Ghafran & O'Sullivan, 2017). In particular, the work expands our knowledge concerning the influence of female directors on audit fees, which has been a topic of interest in recent research (Aldamen et al., 2018; Alkebsee et al., 2021; Fernández-Méndez & Pathan, 2023; Garcia-Blandon et al., 2023; Gul et al., 2008; Gull et al., 2021; Harjoto et al., 2015; Huang et al., 2014; Ittonen et al., 2010; Lai et al., 2017; Miglani & Ahmed, 2019; Nekhili et al., 2020; Sellami & Cherif, 2020). Moreover, our study delves into the relatively unexplored field of previous interactions within firms characterized by concentrated ownership (Alkebsee et al., 2021; Nekhili et al., 2020; Sellami & Cherif, 2020), taking a unique perspective compared to previous studies in this domain. Importantly, we introduce a signalling

Table 6
The moderating effect of pyramids on the association between board gender diversity and audit fees.

Dependent variable	*Audit fees*	
	Model 17	Model 18
GD_Board	0.598***	
	(2.97)	
GD_AuditCom		0.294**
		(2.58)
Pyramids	−0.228***	−0.080*
	(−7.37)	(−1.85)
GD_Board x Pyramids	0.012***	
	(5.12)	
GD_AuditCom x Pyramids		0.003**
		(2.28)
Size	0.306***	0.463***
	(17.14)	(8.88)
Board	0.409***	0.128
	(7.73)	(0.93)
ROA	0.004	0.005***
	(0.54)	(5.67)
Debt	0.003***	0.005***
	(5.76)	(3.16)
Age	−0.008***	−0.008**
	(−7.33)	(−2.30)
CEO_Duality	0.013	0.053
	(0.57)	(0.74)
Complex	0.005***	0.002***
	(3.23)	(3.58)
Voting	0.005	0.007***
	(1.63)	(3.58)
Constant	−1.387	−3.344***
	(−0.85)	(−4.89)
Industry effect	Yes	Yes
Year effect	Yes	Yes
F test	4625.25***	1050.68***
Hansen Test	76.23	39.03
M2	−0.22	0.15
Z1	164.79***	18.85***
Z2	15.49***	10.85***
Z3	23.109***	35.40***
No. of observations	975	975

*, **, *** indicate significant at 10 %, 5 %, 1 %, respectively.
Standard errors are clustered by firm.

rationale, which has often been overlooked in prior research. We contribute by showing that in settings where controlling owners significantly influence the nomination and dismissal of female directors, analysing the impact of these directors on audit polices requires a deep understanding of these controlling owner's motivations for their appointments. This distinction represents a core contribution of our work and highlights its novelty. Additionally, we demonstrate that –by advocating for higher audit quality– female directors help to mitigate the adverse effects of the Type II agency conflicts commonly observed in such settings. This novel perspective adds a fresh dimension to the gender diversity literature. We also contribute by showing that the governance role of female directors is strengthened in the presence of structures that allow a divergence between the voting rights and cash flow of the controlling owner. We therefore provide novel evidence on the issue.

Our findings also provide some practical implications and are especially relevant given the widespread prevalence of ownership concentration in various countries (Faccio & Lang, 2002; La Porta et al., 1999). Companies, investors, and policymakers should consider the benefits of appointing female directors in the considered setting. Their presence in the board provides these firms with potential reputational benefits and better protection of minority shareholder interests. Additionally, understanding how the governance roles of female directors are amplified in the presence of voting-cash flow wedges can inform decisions related to board composition, especially in firms with concentrated ownership structures.

Table 7
The moderating effect of COVID on the association between board gender diversity and audit fees.

Dependent variable	*Audit_fees*	
	Model 19	Model 20
GD_Board	0.003***	
	(4.41)	
GD_AuditCom		0.002***
		(5.14)
Covid	−0.331***	−0.203***
	(−11.08)	(−11.48)
GD_Board x Covid	0.010***	
	(9.89)	
GD_AuditCom x Covid		0.004***
		(10.34)
Size	0.335***	0.327***
	(29.52)	(21.93)
Board	0.269***	0.366***
	(12.15)	(6.61)
ROA	0.003***	0.003***
	(11.10)	(12.63)
Debt	0.005***	0.006***
	(16.03)	(14.18)
Age	0.004***	0.004***
	(4.87)	(4.52)
CEO_Duality	−0.022	−0.056**
	(−0.83)	(−2.14)
Complex	0.002***	0.002***
	(3.86)	(3.81)
Voting	0.002***	0.002***
	(3.78)	(3.81)
Constant	−1.659***	−1.713***
	(−13.55)	(−10.87)
Industry effect	Yes	Yes
F test	86,332.07***	14,228.71***
Hansen Test	85.33	83.69
M2	0.26	0.16
Z1	1477.12***	295.44***
Z2	44.10***	15.90***
No. of observations	975	975

*, **, *** indicate significant at 10 %, 5 %, 1 %, respectively.
Standard errors are clustered by firm.

For future research, it would be insightful to investigate the specific roles female directors play on the board –such as chair or vice-chair positions– and their involvement in different board committees. Recognising that female directors are not a homogeneous group, futures studies might investigate other factors such as education, age, and experience in order to understand how these attributes influence their governance roles and decisions. Comparative studies across different countries and regulatory contexts may provide valuable insights into what impact the varying governance mechanisms and regulations might have on the role of female directors and how they affect audit fees. We leave such inquiries for future research.

Declaration of competing interest

None.

Data availability

No

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