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ORIGINAL PAPER

Political connections and remuneration of bank boards' members: moderating effect of gender diversity

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Abstract
This study investigates the impact of political connections of members of banks' Boards of Directors on these boards' remuneration, and the influence of gender diversity on this impact. Using a panel of observations on 69 eurozone banks supervised by the ECB for the period 2011 to 2019, and the generalized method of moments (GMM), our empirical results indicate that political connections negatively impact average remuneration. In our view, directors with political connections prefer other types of benefits, aiming at future political positions and not wanting to be associated with high remunerations. Meanwhile, gender diversity accentuates this negative effect, a finding that may be related to the fact that, by including female directors, shareholders try to reduce the level of opportunistic behavior associated with political connections. Overall, we find that our results are robust across different choices of measures of gender diversity.

Keywords Political connections · Gender diversity · Remuneration · ECB · GMM

JEL Classification G21 · G34 · G41 · J16

1 Introduction

The remuneration of members of the Boards of Directors has received considerable attention, from both the academic community and the business community, especially after the financial crisis of 2007/2008 (Cook et al. 2019). This crisis

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exposed weaknesses in the banking sector concerning risk control and management (Ayadi et al. 2019). Management remuneration has been identified as one of the causes for the crisis mentioned above, in the sense that it encouraged the taking of excessive risks (García-Meca 2016; Boateng et al. 2019) with real economic impact (Owen and Temesvary 2019). To minimize this weakness, American and European authorities, especially since 2013, have been intensively regulating the remuneration policies of the members of the banks' Board of Directors, to force them to eliminate incentives linked to excessive risk-taking (Murphy 2013). The guidelines underlying the regulations were aimed at mitigating the lack of transparency and regulation of the remuneration of the members of the Boards of Directors, questioned at the time of the 2007/2008 crisis (de Andrés et al. 2019).

In addition to the remuneration of banks' Boards of Directors, two other important characteristics of these boards have received particular attention from recent literature: i. the presence of politicians or ex-politicians on the Boards of Directors (García-Meca 2016; Hung et al. 2017, 2018; Chen et al. 2018), which leads to the existence of political connections and politically connected companies (Saeed et al. 2016; Chen et al. 2018), and ii. the existence of policies and practices that seek to include people considered in some way different from traditional people in organizations, thereby promoting a more inclusive culture (Herring 2009), with emphasis on gender diversity (García-Meca et al. 2018; Owen and Temesvary 2018, 2019).

The effect of political connections and gender diversity on the remuneration of the Boards of Directors has been studied individually, not allowing for possible interactions between the two. Furthermore, the direction of its effect is far from being consensual. With regard to political connections, recent literature (Ding et al. 2015; García-Meca 2016; Abdul et al. 2018; Fralich and Fan 2018; Wu et al. 2018; Fung and Pecha 2019) has found that the effects of political connections on the remuneration of board members and/or CEO are either positive, negative or simply nonexistent. The study by García-Meca (2016) seems to be the only one that focuses on the banking sector. Thus, further studies on these themes in the banking sector seem opportune. The present paper aims to study the impact of political connections on the remuneration of banks' Board of Directors, also analyzing the influence of gender diversity on that impact. Thus, we aim to answer two important research questions: i. What is the impact of political connections on the remuneration of the members of banks' boards? and, ii. How does gender diversity affect the relationship between political connections and remuneration? We try to provide meaningful answers to these questions across three important occurrences which took place during the period under study: i. the introduction of gender quotas in 2013 in ECB up to 35% in 2019 (European Central Bank 2018a), which can be interpreted by supervised banks as a model to be implemented by the supervisor, as is being done with the new Guide to fit and proper assessments in 2021 (European Central Bank 2021a); ii. the Directive 2013/36/EU (CRD IV) of the European Union, in force as of July 2013, defining corporate governance principles, promoting diversity in board composition, defining the structure of remuneration policies, discouraging excessive risk-taking behavior; and, iii. the responsibility, assumed by the ECB in November 2014, for the validation of decisions regarding the appointment of members of the

Boards of significant banks, assessing the adequacy and suitability of candidates (European Central Bank 2017).

We think that our study conveys relevant contributions to the extant literature. Firstly, to the best of our knowledge, the impacts of this regulatory framework have not been studied before. To this effect we consider a sample of 69 banks supervised by the ECB, from 2011 to 2019, a period that covers the two levies by the ECB and the one by the European Union. Through the present study we aim at a better understanding of the effect of political connections, gender diversity, and public impositions on the Boards of Directors (e.g., regulation on gender diversity and assessment of members' suitability) on remuneration policies. Furthermore, the study departs from the existing literature (Fralich and Fan 2018; Wu et al. 2018; Fung and Pecha 2019), in that it analyzes the remuneration of the boards, not only of the CEO, since all Boards members are responsible for the management of banking organizations.

Secondly, in our view, the study provides a valuable source of knowledge for Regulating Authorities (ECB and European Union). Our results may help assess the impact of its measures (ECB's gender quota, CRD IV, ECB direct supervision) on the remuneration policies of banks. These entities can evaluate whether: i. the gender quota accentuates or mitigates the impact of political connections on remunerations; ii. political connections are perpetuated in the banking system over the study period and have an impact on remuneration; and iii. Directive 2013/36/EU favors sound management in the banking sector, with regard to board members' remuneration.

Finally, the present paper focuses on the banking sector which plays a vital role in most economies, both nationally and locally, for the efficient transformation of savings in investment (Pathan and Faff 2013; Ebrahimnejad et al. 2014) and their contribution to the payment and liquidity system (Fama 1985). Only a stable and solid financial market allows the resources obtained by banks (deposits/savings) to be allocated to the most productive projects, thus favoring economic development (Huang et al. 2015), attested by the future growth of the Gross Domestic Product (Jokipii and Monnin 2013). Indeed, the development of the financial sector affects the speed and pattern of countries' economic development (Levine 1997). Furthermore, the banking sector has specific characteristics, such as asymmetric information, which facilitates the concealment of political motivations in loans, as well as the fact that banks operations, across the economy as a whole, provide more opportunities for political influences (Dinc 2005). In addition, the banking sector is subject to specific regulations with significant effects on the composition (Booth et al. 2002) and remuneration (García-Meca 2016) of Boards of Directors.

The remainder of the paper is structured as follows. Section 2 focuses on the review of the literature relevant to our research questions. Section 3 describes the sample and methodology. Section 4 presents and comments on empirical results. Finally, Sect. 5 concludes the paper, referring its limitations and suggesting future related research.

2 Background and research hypotheses

One of the consequences of the 2007/8 financial crisis was the emanation of regulatory measures aimed at the remuneration of bank administrations, especially after 2013. In this sense, the European Union approved the Directive 2013/36/EU, known as CRD IV, establishing that Competent authorities, in particular the ECB, must ensure that banking institutions comply with the principles set out in the Directive on personnel remuneration policies. Specifically, this Directive defines the principles of corporate governance, promotes diversity in board composition, defines the structure of remuneration policies, discouraging excessive risk-taking behavior, which can compromise the sound and effective management of risks (European Parliament and European Council 2013a). This same year, the Regulation n.º 575/2013 of the European Parliament and the European Council also established prudential requirements for credit institutions, highlighting the importance of sound remuneration policies (European Parliament and European Council 2013b). Subsequently, in 2014, the European Commission approved the Delegated Regulation n.º 604/2014 which complements the previous Directive, identifying the categories of staff whose professional activities have a significant impact on the institution's risk profile, which include administrators (European Commission 2014). Other diplomas on the subject were issued by the European Banking Authority (EBA), namely the following: i. EBA/GL/2015/22, on guidelines for healthy remuneration policies (European Banking Authority 2016a); ii. EBA/GL/2016/06, on guidelines regarding remuneration policies and practices related to retail banking products and services sale and supply of European Banking Authority (2016b); and iii. EBA/GL/2017/11, on internal government guidelines (European Banking Authority 2018). In the same line, the ECB has published guidelines on remuneration policy by issuing letters, which it sends to the banks under its supervision, stressing the importance of a solid remuneration policy (European Central Bank 2018b, 2019a).

The guidelines mentioned above are intended to promote sound remuneration management of banks' Boards members. Nonetheless, the literature has verified that qualitative characteristics of these bodies, such as, the existence of political connections, can affect strategic decisions of organizations, including the remuneration policy, one essential determinant of corporate governance (García-Meca 2016).

The occurrence of political connections in the board can be viewed in the light of the Theory of Resource Dependency, which maintains that organizations need to acquire and exchange resources, leading to a dependency between companies and external units, of which governments are an example (Mateos de Cabo et al. 2012). Such dependence creates risks and uncertainty which can be attenuated by establishing political connections (Hillman 2005), allowing companies to obtain a more reliable resource base to increase their value (Wong and Hooy 2018). Thus, these political connections correspond to a social relationship in order to acquire authority or power (Wong and Hooy 2018), are omnipresent (Banerji et al. 2018), and can be considered a type of "invisible corruption" (Domadenik et al. 2016;

Guo 2019). Nonetheless, we cannot ignore that, according to Agency Theory, as proposed by Jensen and Meckling (1976), the separation between shareholders and managers generates agency problems that constitute an incentive for Board members with political connections to use political resources for their personal interest, to the detriment of shareholders' interests. This can lead, for example, to excessive compensation in the form of higher wages (Shleifer and Vishny 1989) and expropriation of shareholders' wealth (Bebchuk and Fried 2004). However, in the light of Agency Theory, if management remuneration policy creates agency problems, shareholders can use this same policy to monitor managers, thus mitigating agency problems (Dong and Ozkan 2008) as many political connections increase the risk of agency problems (Haris et al. 2019) Thus, this may imply a negative relationship between political connections and remuneration.

Political connections have been studied from different perspectives, referring, for example, their impact on remuneration policy (Ding et al. 2015; García-Meca 2016; Fung and Pecha 2019), on firm's performance (Hung et al. 2017; Saeed et al. 2017; Wong and Hooy 2018), their role in financial markets (Faccio et al. 2006), in fiscal policies (Adhikari et al. 2006; Lin et al. 2015; Li et al. 2016), and job creation (Menozzi et al. 2012). Specifically, companies with political connections more easily obtain investment projects, bank loans (Wang et al. 2019), green subsidies (Lin et al. 2015), face lower tax rates (Adhikari et al. 2006; Li et al. 2016), higher stock quotes (Faccio 2006), as well as greater ease of entry into industries with strong barriers (Chen et al. 2014). In addition, it has been shown that political connections have a positive effect on employment (Menozzi et al. 2012), increasing the likelihood that companies be rescued in times of economic difficulties (Faccio 2006; Faccio et al. 2006), which leads to a decrease in systemic risk and, consequently, lower cost of capital (Boubakri et al. 2012). Nonetheless, the literature has also reported negative effects of political connections on corporate performance. In particular, companies with political connections can have lower levels of productivity (Domadenik et al. 2016), make sub-optimal investments (Ling et al. 2016), have higher debt ratios (Faccio 2010) and often elect less competent elements for management positions, for their connections with other members of the Board of Directors (García-Meca 2016).

We should note that the recent literature is far from consensual regarding the effects of political connections on the remuneration of board members and/or CEO's: while some studies sustain a positive effect (García-Meca 2016; Fralich and Fan 2018; Wu et al. 2018) or indicate a negative effect (Fung and Pecha 2019), other studies find no significant effect (Ding et al. 2015; García-Meca 2016; Abdul et al. 2018). It should be noted that, among these studies, only García-Meca (2016) studies the banking sector in a single European country (Spain); all remaining studies involve listed non-financial companies. García-Meca (2016), using Agency Theory as a reference, shows that the presidents of Spanish savings banks with political connections use their networks and internal power to extract a high level of remuneration; however, the percentage of politicians on the boards does not significantly affect the remuneration of these elements, showing only a negative relationship. Also, Wu et al. (2018) rely on Agency Theory to demonstrate that political connections bring value to organizations, so they must be

considered when determining the remuneration of their CEO. Moreover, companies may be willing to provide higher remuneration, taking into account the benefits associated with political connections (Horton et al. 2012; Ding et al. 2015), which can be a strategic factor (Fralich and Fan 2018). In this same sense, Ding et al. (2015) show that politically connected executives receive higher compensation in private companies than in public ones, since they use public companies to obtain power at the expense of higher pay. In addition, these authors conclude that members of boards with political connections receive higher remuneration only when owners do not have substantial political influence. However, Fung and Pecha (2019) do not find significant results between the level of remuneration and political connections, verifying that members with political connections are less likely to receive higher remunerations, which may mean that these members intend to hold government positions in the future, not wanting to be associated with excessive remuneration, as high remunerations is perceived negatively in political circles. Fralich and Fan (2018) conclude that in Chinese entities members with political connections act in support of the Chinese national government's policy of social harmony, preventing excessive executive compensation. Moreover, other studies, that investigate "value", find that members with political connections lack banking experience in areas such as accounting, finance and corporate governance and serve in multiple directorships (Kang and Zhang 2018), not demanding high remunerations.

Given the above considerations, the mixed and scarce results that the literature has indicated for the relationship between political connections and remuneration suggest the convenience for further studies—namely because it is not straightforward to foresee the impact of political connections on remuneration. However, according to the Theory of Resource Dependence, it is not clear whether all political connections provide essential resources that justify high remuneration (Fralich and Fan 2018), and from the perspective of Agency Theory, the remuneration policy can be a way to monitor directors, thereby mitigating agency problems and reducing remunerations (Dong and Ozkan 2008). Moreover, higher remunerations are perceived negatively in political circles, which is why directors with political connections tend to maintain a low profile so as to hold government positions in the future (Fung and Pecha 2019). Thus, we propose the following hypothesis:

H1 Board remunerations in eurozone banks are negatively related to political connections of the boards' members.

Regarding gender diversity, the study of its impact on boards' composition has also received increasing attention in the literature. Two main reasons explain this finding: i. women are still underrepresented in these councils in most countries worldwide (Yap et al. 2017); and ii. several European countries, such as Norway, Spain, Finland, Iceland, France, Italy, and Belgium, have defined gender quotas in the Boards of Directors (Pucheta-Martínez and Bel-Oms 2015; Terjesen et al. 2015), apparently in view of the positive effects of this diversity (Arnaboldi et al. 2020) according to finance behavioral. This branch of finance observes that

male and female economic agents exhibit behavioral differences. For example, women are more risk and competition averse, their preferences are more flexible (Croson and Gneezy 2009) and are less power-oriented (Adams and Funk 2012). They also exhibit greater ethical concerns (Ku Ismail and Abdul Manaf 2016), propose less aggressive strategies, invest less in research and development and more in social sustainability initiatives (Apesteguia et al. 2012), which implies that the companies to which they belong have higher levels of social responsibility (Fernández-Gago et al. 2016; Galbreath 2018). It has also been suggested that men exhibit overconfidence in decision-making (Barber and Odean 2001; Huang and Kisgen 2013), while women develop a more confident leadership style than men (Trinidad and Normore 2005).

The literature analyzing the relationship between gender diversity in the Boards of Directors and their remuneration policies is somewhat inconclusive. While some studies show that gender diversity increases the remuneration of members of the boards (O'Reilly and Main 2010; Abdul et al. 2018) and some studies conclude to the contrary (Westphal and Zajac 1995), other papers report insignificant effects (García-Meca 2016; Fralich and Fan 2018; Wu et al. 2018; Fung and Pecha 2019). Westphal and Zajac (1995) find that the higher the demographic similarity in the Boards, the higher the CEO's remuneration. Thus, García-Meca (2016) states that directors, being more cautious in remuneration policies, reduce the remuneration of the board members, given their ethical behavior, risk aversion and better ability to identify unethical conduct. Thus, the presence of women on the Boards of Directors can reduce opportunistic behavior, leading to greater control of the salaries of the members of these boards (Pucheta-Martínez et al. 2017). However, some studies show a positive relationship between the presence of the female gender and the remuneration of the boards' members. This relationship is justified by the fact that feminine elements are more generous, have less experience, and can be convinced to grant higher remunerations to CEO's (O'Reilly and Main 2010). Directors may also have difficulties in making decisions on key issues, such as the remuneration of members of the Board of Directors (Pucheta-Martínez et al. 2017). Nonetheless, given that women may also be sought to improve the performance of organizations, they may increase remuneration in view of this objective (Abdul et al. 2018). Moreover, gender diversity may mitigate agency costs and conflicts of interest between directors and shareholders (Jurkus et al. 2011) because female directors improve the board's control and monitoring (Carter et al. 2003; Adams and Ferreira 2009), which can affect remunerations.

Considering the duality of results, some of the literature has moved towards the study of nonlinear relationships between gender diversity and the remuneration of members of the Boards of Directors, providing empirical support for a U-shaped relationship (Pucheta-Martínez et al. 2017; Owen and Temesvary 2019). Pucheta-Martínez et al. (2017), in their study of Spanish non-financial listed companies, find that there is greater cohesion between groups as the presence of the female gender increases in the board, which may lead to lower CEO remuneration. However, cooperative behavior can be replaced by competitive practices, since the inclusion of more female members can cause dissatisfaction in the boards, increasing the salary of CEO's (Pucheta-Martínez et al. 2017). Owen and Temesvary (2019) show that

the negative influence of gender diversity on remuneration, which is beneficial for the American banking sector, comes from reduced diversity (up to 22.5%). Given that the relationship between gender diversity and remuneration is unclear, we propose the following study hypothesis:

H2a Gender diversity in eurozone boards' banks influence the board remuneration in eurozone banks.

Inspired by these dual results mentioned above, the present study analyzes the effect of gender diversity upon the relationship between political connections on board members' remuneration. To the best of our knowledge, this has not yet been investigated in the literature. Nonetheless, as women have more significant ethical concerns (Ku Ismail and Abdul Manaf 2016), it is our conviction that the presence of female elements on the Boards of Directors politically exposed conditions unethical practices, affecting the remuneration of its members. Pucheta-Martínez et al. (2017) state that women reduce opportunistic behaviors associated with political connections, lowering remunerations, and Abdul et al. (2018) state that women's presence increases responsibility and improves communication, leading to better governance. Indeed, in light of Agency Theory, as female directors improve the board's control and monitoring, gender diversity may mitigate agency costs and conflicts of interest between directors and shareholders (Jurkus et al. 2011), thereby helping to reduce remunerations.

Thus, it is expected that gender diversity negatively impacts the political connections-remuneration relationship, *i.e.*, gender diversity can accentuate the negative effect of political connections on remuneration. Therefore, in this study, we aim to provide a meaningful answer to our second research question regarding the impact of gender diversity on the relationship between political connections and remuneration of board members. This research hypothesis can be described as follows:

H2b Gender diversity in boards of eurozone banks accentuates the negative effect of political connections on remuneration.

In order to appropriately address our research questions, as already mentioned, we should consider the three relevant measures issued during the period under study (introduction of gender quotas in 2013 in ECB up to 35% in 2019 (European Central Bank 2018a), Directive 2013/36/EU (CRD IV) of the European Union, in force as of July 2013, and the responsibility, assumed by the ECB in November 2014, for the validation of decisions regarding the appointment of members of the Boards members of significant banks, assessing the adequacy and suitability of candidates (European Central Bank 2017).

Analyzing the measures imposed in 2013, three channels could explain the effect of these measures on the relationship between gender diversity and remuneration: i. CRD IV expresses remuneration rules, affecting the boards' remuneration; ii. Gender quotas and CRD IV, as express gender diversity promotion, impact gender diversity; iii. CRD IV and gender quotas include implicit corporate

governance principles, and, in accordance with the signalling theory, the market shows that banks with higher remunerations are well-governed. Each of these three channels is now detailed.

On the one hand, tighter rules on variable remuneration, implicit in CRD IV, may imply an increase in fixed remuneration, and the consequent increase in total remuneration, as documented by de Andrés et al. (2019). Enguix (2021) also verified an increase in the fixed component after regulatory changes to remuneration policies in European Union banks. However, this author considers that these regulatory changes may have unintended consequences. In his view, directors may exercise discretion in their decisions to hide the remuneration they lost in the variable component, putting the financial system's sustainability at risk. Thus, remuneration policies can increase or decrease boards' remuneration.

On the other hand, gender diversity on the boards, implicit in gender quotas and CRD IV, was intended to make the banks' corporate governance more robust (European Banking Authority 2017) and promote ethical concerns. The literature also reports that gender quotas legislation impacts the composition of boards of directors (Terjesen et al. 2015), namely their increase (Valls Martínez and Cruz Rambaud 2019). This increase may not bring more experienced women to the office (Grosvold and Brammer 2007). Our hypothesis H2a) postulated that the effect of gender diversity on the board of directors' remuneration is unclear because more women can cause an increase or decrease in boards' remuneration. Thus, as gender quotas imply more gender diversity, this diversity can bring more remuneration or not for directors.

Furthermore, the signalling theory also provided support for the relation between the corporate governance characteristics of board directors and their remuneration. According to this theory, reductions in remuneration are understood as a negative signal for the market, so banks intend to maintain high remuneration levels (van Veen and Wittek 2016). From the point of view of this theory, regulatory measures such as CRD IV and gender quotas, designed to impose better corporate governance, may lead to higher remuneration of the boards of directors. This increase is explained by the fact that boards have experienced directors with high ethical standards that promote and authorize sound remuneration, protecting the shareholders' interests (Bergh et al. 2014; Elnahass et al. 2022). Thus, high remunerations, explained by ethical and well-governed boards, are a positive signal for the market.

Given the above, it appears in the literature that remuneration policies with less risk (CRD IV) and gender diversity (CRD IV and gender quota) may imply more or less remuneration for the members of the Board of Directors. Thus, as the effect of the gender quota or remuneration legislation, like CRD IV, on the relationship between gender diversity and remuneration is unclear, we propose the following hypothesis:

H3a The ECB gender quota and the CRD IV influence the effect of gender diversity on board remuneration in eurozone banks.

When we analyze the impact of the 2013 measures imposed in 2013 on the effect of gender diversity upon the relationship between political connections and remuneration, we propose a three-channel explanation. On the one hand, the tighter remunerations measures present in CRD IV can lead to either higher or lower remunerations (de Andrés et al. 2019; Enguix 2021). On the other hand, better gender corporate governance practices (CRD IV and gender quota) can lead to a greater gender diversity, accentuating the relationship between political connections and remuneration, as explained in hypothesis H2b.

Nonetheless, according to the signalling theory, regulatory measures may lead to higher remuneration, as banks need to signal confidence to the market, and remuneration is one of the adopted practices. Thus, the market will understand that the regulatory measures will impose discipline, providing banks with diversified boards of directors, with increased ethical concerns, monitoring opportunistic behavior of politically connected directors, having, therefore, to be monetarily compensated for the fruitful work of the Bank (Elnahass et al. 2022).

In view of the above, a definite sign for this relationship seems unclear, so we propose the following hypothesis:

H3b The ECB gender quota and the CRD IV influence the impact of the effect of gender diversity on the relationship between political connections and remuneration in eurozone banks.

Regarding the ECB's direct supervision and analysis of the board members' suitability from 2014, the supervisor can exclude members who would favor their personal interests first and who demanded higher remuneration. Thus, we expect this measure to mitigate the negative impact of political connections on remuneration. We formulate our fourth hypothesis as:

H4 The ECB's direct supervision mitigates the negative effect of political connections on board remuneration in eurozone banks.

In this way, we try to answer our two main research questions in the context of the differentiated impact of these three measures (the ECB gender quota, the Directive 2013/36/EU and the ECB's direct supervision) on remuneration. The model and the underlying hypotheses are represented in Fig. 1. This figure depicts the direct effects of political connections and gender diversity on remuneration (H1 and H2a, respectively) and the moderating effects under the present study—gender diversity on the relationship between political connections and remuneration (H2b), ECB gender quota and CRD IV on the relationship between gender diversity and remuneration (H3a), ECB gender quota and CRD IV upon the effect of gender diversity on the relationship between political connections and remuneration (H3b), and ECB's direct supervision on the relationship between political connections and remuneration (H4).

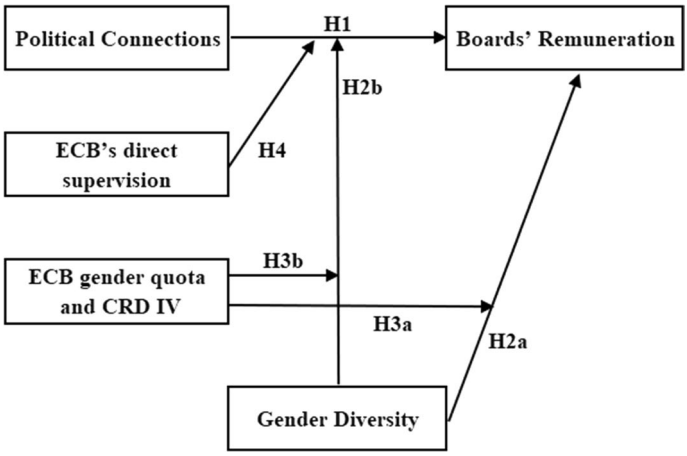

Fig. 1 Model under study with hypotheses

3 Sample, variables and model

3.1 Sample

The present sample comprises 69 eurozone banks, within the total number of entities supervised by ECB, in the 19 countries adopting the euro currency (117 entities on 1.01.2019, (European Central Bank 2019b). Banks directly supervised by the ECB represent 82% of the Euro area banking assets (European Central Bank 2018c) and the banks included in the sample corresponded, in 2019, to 79.5% of the total assets of significant banks, *i.e.*, banks under direct supervision by the ECB. These entities are considered significant according to such criteria as asset size, economic importance, cross-border activities, and direct public financial assistance (European Central Bank 2018d). Of the total number of banks directly supervised by the ECB, we consider banks with available data for the variables used in the study. Table 1 compares, by country, the banks supervised by the ECB and those in our sample.

The period under analysis runs from 2011 through 2019. This period was chosen for three main reasons. Firstly, since 2013, internally, the ECB has introduced gender quotas up to 35% in 2019 (European Central Bank 2018a). The ECB is thus promoting gender diversity, as in Spain through the Equality Law (Reguera-Alvarado et al. 2017). Secondly, since November 2014 the ECB has been responsible for decisions regarding the appointment of directors of banks under its direct supervision, assessing candidates' suitability (European Central Bank 2017). Non-significant banks are under the supervision of central banks of their respective countries, which have aligned their rules with those issued by the ECB (Bank of Portugal 2018). Thirdly, in 2013 the European Union approved Directive 2013/36/EU (CRD IV) which establishes that banking institutions comply with principles set out in the Directive on personnel remuneration policies and promote diversity in board composition (European Parliament and European Council 2013a).

Table 1 Banks included in the sample by country

Country	Supervised entities	Banks in sample	LEI code	Name of bank
Austria	6	2	PQOH26KWDF7CG10L6792	Erste Group Bank AG
			9ZHRYM6F437SQJ6OUG95	Raiffeisen Bank International AG
Belgium	7	5	549300NBLHT5Z7ZV1241	Banque Degroof Petercam SA
			A5GWLFH3KM7YV2SFQL84	Belfius Banque SA
			D3K6HXMBBB6SK9OXH394	Dexia SA
			5493008QOCP58OLEN998	d'investissements Argenta SA
			213800X3Q9LSAKRUWY91	KBC Group NV
Cyprus	3	1	CXUHEGU3MADZ2CEV7C11	Hellenic Bank Public Company Limited
Germany	21	14	EZKODONU5TYHW4PP1R34	Aareal Bank AG
			VDYMYTQGZZ6DU0912C88	Bayerische Landesbank
			851WYGNLUQLFZBSYGB56	COMMERZBANK Aktiengesellschaft
			0W2PZJM8XOY22M4GG883	DekaBank Deutsche Girozentrale
			5299007S3UH5RKUYDA52	Deutsche Apotheker- und Ärztebank eG
			7LTWFZYICNSX8D621K86	Deutsche Bank AG
			DZZ47B9A52ZJ6LT6VV95	Deutsche Pfandbriefbank AG
			TUKDD90GPC79G1KOE162	HSH Nordbank AG
			B81CK4ESI35472RHJ606	Landesbank Baden-Württemberg
			DIZES5CFO5K3I5R58746	Landesbank Hessen-Thüringen Girozentrale
			0SK1ILSPWNVBNQWU0W18	Landeskreditbank Baden-Württemberg-Förderbank
			529900GM944JT8YIRL63	Münchener Hypothekenbank eG
			DSNHHQ2B9X5N6OUJ1236	Norddeutsche Landesbank-Girozentrale-
			52990002O5KK6XOGJ020	NRW.BANK
Estonia	3	3	549300ND1MQ8SNNYMJ22	AS SEB Pank
			213800JD2L89GGG7LF07	Luminor Bank AS
			549300PHQZ4HL15HH975	Swedbank AS

Table 1 (continued)

Country	Supervised entities	Banks in sample	LEI code	Name of bank
Spain	12	9	K8MS7FD7N5Z2WQ51AZ71	Banco Bilbao Vizcaya Argentaria, S.A
			SI5RG2M0WQQLZCXKRM20	Banco de Sabadell, S.A
			5493006QMFDDMYWIAM13	Banco Santander, S.A
			VWMYAEQSTOPNV0SUGU82	Bankinter, S.A
			549300GT0XFTFHGOIS94	BFA Tenedora De Acciones S.A.U
			7CUNS533WID6K7DGFI87	CaixaBank, S.A
			549300OLBL49CW8CT155	Ibercaja Banco, S.A
			635400XT3V7WHLSFYY25	Liberbank, S.A
			5493007SJLLCTM6J6M37	Unicaja Banco, S.A
Finland	3	1	7437003B5WFBOIEFY714	OP Osuuskunta
France	12	6	R0MUWSFPU8MPRO8K5P83	BNP Paribas S.A
			9695005MSX1OYEMGDF46	BPCE S.A
			969500TJ5KRTCJQWXH05	Crédit Agricole S.A
			F0HUI1NY1AZMJMD8LP67	HSBC France
			96950066U5XAAIRCPA78	La Banque Postale
			O2RNE8IBXP4R0TD8PU41	Société Générale S.A
Greece	4	2	5UMCZOEYKCVFAW8ZLO05	National Bank of Greece S.A
			M6AD1Y1KW32H8THQ6F76	Piraeus Bank S.A
Ireland	6	1	635400KQIMALJ4XLAD78	Ulster Bank Ireland Designated Activity Company

Table 1 (continued)

Country	Supervised entities	Banks in sample	LEI code	Name of bank
Italy	12	7	F1T87K3OQ2OV1UORLH26	Banca Carige S.p.A.—Cassa di Risparmio di Genova e
			J48C8PCSJVUBR8KCW529	Banca Popolare di Sondrio, Società Cooperativa per Azioni
			N747OI7JINV7RUUH6190	BPER Banca S.p.A
			815600AD83B2B6317788	Credito Emiliano Holding S.p.A
			NNVPP80YIZGEY2314M97	ICCREA Banca S.p.A.—Istituto Centrale del Credito
			PSNL19R2RXX5U3QWHI44	Mediobanca—Banca di Credito Finanziario S.p.A
			549300TRUWO2CD2G5692	UniCredit S.p.A
Lithuania	2	2	549300SBPFE9JX7N8J82	AB SEB bankas
			549300GH3DFCXVNBHE59	Swedbank, AB
Luxembourg	6	1	R7CQUF1DQM73HUTV1078	Banque et Caisse d'Epargne de l'Etat, Luxembourg
Latvia	2	2	549300YW95G1VBBGGV07	AS "SEB banka"
			549300FXBIWWGK7T0Y98	"Swedbank" AS
Malta	3	3	529900RWC8ZYB066JF16	Bank of Valletta plc
			549300X34UUBDEUL1Z91	HSBC Bank Malta p.l.c
			213800TC9PZRBHMJW403	MDB Group Limited
Netherlands	6	3	529900GGYMNGRQTDOO93	BNG Bank N.V
			DG3RU1DBUFHT4ZF9WN62	Coöperatieve Rabobank U.A
			549300NYKK9MWM7GGW15	ING Groep N.V
Portugal	3	2	JU1U6S0DG9YLT7N8ZV32	Banco Comercial Português, SA
			TO822O0VT80V06K0FH57	Caixa Geral de Depósitos, SA
Slovenia	3	2	549300271OUEJT4RYD30	Abanka d.d
			5493001BABFV7P27OW30	Nova Ljubljanska Banka d.d. Ljubljana

Table 1 (continued)

Country	Supervised entities	Banks in sample	LEI code	Name of bank
Slovakia	3	3	549300S2T3FWVVXWJI89	Slovenská sporiteľňa, a.s
			3157002JBFAI478MD587	Tatra banka, a.s
			549300JB1P61FUTPEZ75	Všeobecná úverová banka, a.s
Total	117	69		

It should be noted that the fact that a candidate for the management of a significant bank currently holds, or held in the past two years, a political experience does not prevent him from being accepted—unless there are significant conflicts of interest, assessed by examining the nature and powers of political office and its relationship with the bank (European Central Bank 2017; Bank of Portugal 2018). Given that our sample comprises only banks directly supervised by ECB, the regulatory framework for political connections is the same for all entities, as all banks under analysis share and have to comply with the same rules—contrarily to what happens in studies on banks subject to a different regulatory framework (García-Meca et al. 2015; Chen et al. 2018).

Data were collected in two stages. In a first step, we collected the names of the members of the banks' boards from their reports and accounts. Then, in order to assess the possible existence of political connections of these elements, their biographies, published on banks' websites, were analyzed. Whenever this information is not on the banks' webpages, press releases, annual bank account reports and LinkedIn pages were used, in line with the approach of Hung et al. (2017). The data on these members' remuneration is from the Reports and Accounts and from the Pillar III reports.[1] Banks' financial data were taken from the Moody's Analytics BankFocus and Orbis Europe databases; data on macroeconomic variable were obtained from the International Country Risk Guide.

In the case of two-tier boards, we consider the management board because we are interested in the influence of political connections on bank administrations' decisions. Here we follow the strand of the literature that proposes a separate treatment of the two boards in two-tier board banks, rather than joining them as a single board (e.g., Nomran and Haron 2019; Fernández-Temprano and Tejerina-Gaite 2020).

3.2 Variables

3.2.1 Dependent variable

To measure the remuneration policy of the Boards of Directors, the literature has used the following proxies: i. log of the total remuneration of all board members (García-Meca 2016; Abdul et al. 2018); ii. log of the average remuneration of the boards, *i.e.*, the ratio of the remuneration to the number of board members (García-Meca 2016); iii. log of the bank CEO's remuneration (Pucheta-Martínez et al. 2017; Fralich and Fan 2018; Wu et al. 2018; Fung and Pecha 2019). In this study, we use the second measure (natural logarithm of the average remuneration). Remuneration includes fixed components (salaries) and variable components (monetary benefits), disclosed in the reports supporting the collection of information.

[1] Banking institutions must disclose their risk management and capital ratios in order to comply with the provisions of Basel III Accord, namely with regard to Pillar III.

3.2.2 Explanatory variables

3.2.2.1 Variables of interest With regard to explanatory variables, the level of political connections (denoted as *POLBO*) is measured as the percentage of members of the Board of Directors with political connections in the past, *i.e.*, the percentage of members who worked as a bureaucrat/advisor in a ministry, who was an elected politician and/or who was a former minister (Carretta et al. 2012; García-Meca and García García 2015; García-Meca 2016). Following Owen and Temesvary (2019), gender diversity (denoted as *SIN*) is represented by the Shannon index, which, according to Campbell and Mínguez-Vera (2008) is more sensitive to small variations in the gender composition of the Boards of Directors than the percentage of women in the board. We also calculated this percentage to measure gender diversity (denoted as *WBO*), following García-Meca (2016); Rodríguez-Ruiz et al. (2016); García-Meca et al. (2018); Owen and Temesvary (2018). Following Salachas et al. (2017), we centered both variables, aiming at a reduction of the degree of correlation between the two variables (Aiken and West 1991; Moon 2018).

Table 2 characterizes the sample with regard to gender diversity and political connections. As can be seen, the number of women on the boards of banks supervised by ECB has increased, with a 129.5% growth rate between 2011 and 2019. It is also noted that women, although a minority on boards, have a higher rate of political connections than men. Nonetheless, the percentage of board members with political connections and the percentage of executive board members with political connections decreased over the period, which can be considered in line with the ECB assessment of the suitability of administrations. The number of executives did not vary significantly and there was a growth of elements with academic masters and doctoral degrees.

Two dummy variables ($D1$ and $D2$) were also considered in the study, in order to assess the impact of the ECB regulatory measures, as mentioned in the previous Section. $D1$ refers to the ECB gender quota and the Directive 2013/36/EU, assuming zero value in 2011 and 2012 and value one as of 2013. The indicator $D2$ refers to the ECB's direct supervision of significant banks in 2014, taking zero value in 2011 through 2013 and value one as of 2014.

3.2.2.2 Control variables Both internal (bank-specific) and external determinants (macroeconomic conditions) are used as control variates. Internal determinants are those influenced by management decisions, and external determinants are those that, although outside the bank's control, reflect the economic and legal environment that affects its functioning (Athanasoglou et al. 2008).

In line with previous studies, the following were used as internal determinants (covariate notations in parentheses): i. education level—directors holding a MsC or a PhD degree (*EDU*) (e.g., Berger et al. 2014); ii. board size (*BOARD*) (e.g., García-Meca 2016; Pucheta-Martínez et al. 2018; Habtoor 2020); iii. executive members (*EXEC*) (e.g., Fernandes 2008; Cardinaels 2009; Habtoor 2020); iv. bank size (*TA*) (e.g., García-Izquierdo et al. 2018; Karim 2020); v. leverage (*LEV*) (Pucheta-Martínez et al. 2017; Abdul et al. 2018; Wu et al. 2018); and, iv. non-operational efficiency (*NINC*) (e.g., Hung et al. 2017). The first three determinants are board-related

Table 2 Gender diversity and political connections: summary characterization of the sample

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of women	78	84	106	109	130	149	155	154	179
Number of political women	17	19	25	26	24	28	25	21	20
Number of board members = Total board	716	696	682	684	675	679	687	671	684
Number of political board members	105	92	100	98	87	92	86	81	76
Number of executives	353	354	342	350	345	339	353	352	338
Number of executive women	27	28	34	34	42	52	57	66	75
Number of political executives	45	42	31	33	28	26	28	27	25
Number of political executive women	3	2	2	2	1	2	3	4	4
Number of members with PhD	77	80	89	98	94	88	86	81	82
Number of political members with PhD	15	15	23	26	23	20	17	15	14
Number of female political members with PhD	2	4	7	9	9	8	7	6	5
Number of members with MsC	140	153	149	164	175	191	199	205	212
Number of political members with MsC	14	18	17	13	12	15	16	17	17
Number of female political members with MsC	2	3	3	4	4	4	5	5	4
Average age	59.14	60.19	60.33	60.84	60.80	61.49	61.53	62.22	61.77
Average age of women	51.80	51.94	52.43	52.87	53.01	53.35	54.02	54.36	54.91
Average age of political members	58.60	58.05	59.15	59.90	60.07	60.16	59.43	59.97	60.99
Average age of female political members	56.81	56.69	57.42	58.72	59.91	57.37	57.73	58.83	62.17
Number of women/total board (%)	10.89%	12.07%	15.54%	15.94%	19.26%	21.94%	22.56%	22.95%	26.17%
Number of political women/total board (%)	2.37%	2.73%	3.67%	3.80%	3.56%	4.12%	3.64%	3.13%	2.92%
Number of political women/total political board members (%)	16.19%	20.65%	25.00%	26.53%	27.59%	30.43%	29.07%	25.93%	26.32%
Number of political women/number of women (%)	21.79%	22.62%	23.58%	23.85%	18.46%	18.79%	16.13%	13.64%	11.17%
Number of political men/number of men (%)	13.79%	11.93%	13.02%	12.52%	11.56%	12.08%	11.47%	11.61%	11.09%
Number of political board members/total board (%)	14.66%	13.22%	14.66%	14.33%	12.89%	13.55%	12.52%	12.07%	11.11%
Number of executives/total board (%)	49.30%	50.86%	50.15%	51.17%	51.11%	49.93%	51.38%	52.46%	49.42%
Number of executive women/number of women (%)	34.62%	33.33%	32.08%	31.19%	32.31%	34.90%	36.77%	42.86%	41.90%
Number of political executives/total political board members (%)	42.86%	45.65%	31.00%	33.67%	32.18%	28.26%	32.56%	33.33%	32.89%
Number of political executives/total of executives (%)	12.75%	11.86%	9.06%	9.43%	8.12%	7.67%	7.93%	7.67%	7.40%
Number of members with PhD or MsC/total board (%)	30.31%	33.48%	34.90%	38.30%	39.85%	41.09%	41.48%	42.62%	42.98%
Number of political members with PhD or MsC/total political board members (%)	27.62%	35.87%	40.00%	39.80%	40.23%	38.04%	38.37%	39.51%	40.79%
Number of female political members with PhD or MsC/total female political board members (%)	23.53%	36.84%	40.00%	50.00%	54.17%	42.86%	48.00%	52.38%	45.00%

controls. As a macroeconomic covariate we consider corruption control, as measured through the International Country Risk Guide Corruption Index (*CIN*) (Chen et al. 2018)—in order to control whether countries' corruption levels impact remuneration levels (in line with McFarlane and Das 2019).

Table 3 presents a summary of how the variables were obtained, referring the main studies supporting their operationalization. Table 4 displays descriptive statistics for each variable used. The *REMAV* range between 5.3 and 15.9 and average is 12.6. The average of *POLBO* is 10.7% (maximum 75%) and the average of *WBO* is 15.7% (maximum 66.6%), which is equivalent to an average Shannon index (*SIN*) value of 34.5%. On average, 40.9% of Board members have MsC's or PhD's. The boards of directors have an average of 10 members, half being executives. The average of the natural log of total assets is 18 and the average leverage ratio indicates that debt is 2.2 times higher than equity and this ratio and the efficiency measure *NINC* present negative minimum values, in accordance with the negative equity and negative results reported by some banks, respectively. The average, minimum and maximum corruption index values show that countries have low levels of corruption, that is, high levels of corruption control.

3.3 Regression model and estimation method

3.3.1 Regression model

To address the above research questions and the hypotheses of the present study, we specified the dynamic panel data model:

$$REMAV_{it} = \beta_1 REMAV_{i,t-1} + \beta_2 POLBO_{it} + \beta_3 GD_{it} + \beta_4 GD_{it} POLBO_{it} + \beta_5 D1_t GD_{it} + \beta_6 D2_t POLBO_{it} + \beta_7 D1_t GD_{it} POLBO_{it} + \sum_{j=1}^{J} \theta_j X_{j_{it}} + u_{it} + v_i + w_t, \quad (1)$$

where Greek letters denote parameters, i and t are, respectively, individual- (i.e. bank-) and time-indices, and variables' notation is as follows: *REMAV* denotes the average remuneration, *POLBO* represents political connections, *GD* indicates the gender diversity covariate in general (this covariate is represented by one of two alternative measures—see below), *D*1 and *D*2are dummy variables, that represent regulation changes (*D*1 for the ECB gender quota and the directive 2013/36/EU and *D*2 for the ECB's direct supervision of significant banks in 2014), and X_j, $j=1$, …, J, denote control variates. The error term is assumed to be composed of three terms—v_i, denoting an individual (bank-specific, time-invariant) unobserved effect, w_t, denoting a time-specific effect, and u_{it}, representing remaining unobservables that affect $REMAV_{it}$ and are uncorrelated with individual- and time effects, as well as with the model's covariates.

As already mentioned, the covariate *GD* represents each of the two alternative measures described in the previous subsection (*SIN* and *WBO*), and the set of control variables (X_j, $j=1$, …, J) is described in subsection 3.2.2. and summarized in Table 3.

3.3.2 Estimation method

Each model was estimated by two-step systems GMM, an estimator for panel data dynamic models developed by Blundell and Bond (1998), building upon the previous panel model estimator of Arellano and Bond (1991). Usually, the Blundell-Bond estimator performs better with small samples than the latter, being particularly recommended for short panels (few temporal observations) and when the dependent variable has a high degree of persistence (here, strong correlation between present and past remuneration)—see Blundell and Bond (1998). The estimator allows for the inclusion in the model of lags of the dependent variable, which is important in the present case given that the theoretical framework predicts a dynamic pattern of behavior of the variable remuneration. Furthermore, the estimator is consistent under covariates' endogeneity, which can arise in the present case due to the possible simultaneous determination of the dependent variable and some explanatory variables. For instance, remuneration can explain political connections since banks with better/worse remuneration policies can attract elements with more/less political connections.

In order to prepare the implementation of the panel data estimator, we previously checked the stationarity of the variables used in the study. Table 9 in the Appendix details the results of a panel data test for stationarity of each of the variables used for estimation of model (1) (dependent variable and random covariates' panels). The results of the table indicate that all variables are stationary, so there seems to be no need to consider differences of these variables in the model.

The two-step system GMM estimator combines the initial equation in levels—Eq. (1)—where first differences are used as instruments, with the following equation in first differences, where variables in levels are used as instruments:

$$\begin{aligned}\Delta REMAV_{it} &= \beta_1 \Delta REMAV_{i,t-1} + \beta_2 \Delta POLBO_{it} + \beta_3 \Delta GD_{it} \\ &+ \beta_4 \Delta (GD_{it} POLBO_{it}) + \beta_5 \Delta \left(D1_t GD_{it}\right) + \beta_6 \Delta (D2_t POLBO_{it}) \\ &+ \beta_7 \Delta \left(D1_t GD_{it} POLBO_{it}\right) + \sum_{j=1}^{J} \theta_j \Delta X_{j_{it}} + \Delta u_{it} + \Delta w_t\end{aligned} \tag{2}$$

For the levels equation—Eq. (1)—we use as instruments the second and third differences of the dependent variable and of the terms involving *POLBO* and *SIN*; for the difference equation—Eq. (2)—we use as instruments the dependent variable and all terms involving *POLBO* and *SIN* lagged two and third periods.

In order to validate the adopted specification, two statistical procedures were used, following Dietrich and Wanzenried (2011); Rumler and Waschiczek (2016); Tan (2016); Moon (2018). Firstly, error serial correlation was assessed, with the $m1$ and $m2$ test statistics proposed by Arellano and Bond (1991), for which the null hypothesis is no autocorrelation. It is noted that, in accordance with Arellano and Bond (1991), the GMM estimator is inconsistent under second-order error autocorrelation. A second specification test corresponds to the Hansen test, which assesses the null hypothesis of no correlation between instruments and error term, *i.e.*, the hypothesis that the instruments are valid.

Table 3 Operationalization of variables

Variable	Codename	Formula	Signal	Authors
1. Dependent variables				
Remuneration	*REMAV*	Natural log of the ratio between total remuneration of the board of directors and number of board elements	N.A	García-Meca (2016)
2. Explanatory and control variables				
2.1. Interest variables				
Political connections	*POLBO*	Political board members/total board	+/−	García-Meca (2016)
Gender diversity	*SIN*	$-\sum_i^n P_i lnP_i$, where Pi is the percentage of board members in each category (female/male) and n is the total number of board members	+/−	Campbell and Mínguez-Vera (2008), Yap et al. (2017), Owen and Temesvary (2018)
	WBO	Number of women/Total board (%)	+/−	García-Meca et al. (2015), Pucheta-Martínez et al. (2017), Abdul et al. (2018), Arnaboldi et al. (2020)
The ECB gender quota and the directive 2013/36/EU	*D1*	It assumes zero value in the years 2011 and 2012 and value one in the period 2013 to 2019	+/−	
The ECB's direct supervision of significant banks in 2014	*D2*	It assumes zero value in the years 2011, 2012 and 2013 and value one between 2014 and 2019	+/−	
2.2. Board control variables				
Members holding MsC or PhD degree	*EDU*	Board members holding MsC or PhD/total board	+/−	Berger et al. (2014)
Board size	*BOARD*	Number of board elements		García-Meca (2016), Pucheta-Martínez et al. (2018)
Executive members	*EXEC*	Number of executive members/total board		Fernandes (2008), Cardinaels (2009), Habtoor (2020)

Table 3 (continued)

Variable	Codename	Formula	Signal	Authors
2.3. Other control variables				
Bank size	*TA*	Natural logarithm of total assets		García-Izquierdo et al. (2018), Karim (2020)
Leverage	*LEV*	Debt/total equity	+/−	Pucheta-Martínez et al. (2017), Abdul et al. (2018), Wu et al. (2018)
Non-operational efficiency	*NINC*	Non-interest income/total income	+	Beltratti and Stulz (2012), Duygun et al. (2015), Hung et al. (2017)
Corruption control	*CIN*	Calculated by International Country Risk Guide. This index ranges from 0 to 6, with 6 signifying a low level of corruption/high control of corruption in the country	+	Chen et al. (2018)

Table 4 Descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
REMAV	611	12.583	1.099	5.298	15.889
POLBO	619	0.107	0.144	0.000	0.750
SIN	619	0.345	0.258	0.000	0.693
WBO	619	0.157	0.139	0.000	0.666
EDU	619	0.409	0.264	0.000	1.000
BOARD	619	9.974	5.406	2.000	28.000
EXEC	619	5.050	3.082	0.000	19.000
TA	621	18.073	1.757	11.811	21.495
LEV	621	2.225	7.930	− 12.855	112.676
NINC	621	2.544	8.352	− 0.628	76.694
CIN	621	0.662	0.151	0.333	1.000

Check Table 3 for description of variables

Obs Observations, *Std. Dev.* Standard Deviation, *Min* minimum, *Max* Maximum

4 Empirical results

4.1 Sample correlations

Table 5 shows the sample correlations matrix between the variables used in the study. Expectably, the pair of variables used in the model as mutually alternative exhibit high correlations (*SIN* vs. *WBO*). A negative sample correlation is found between *POLBO* and *REMAV* and between, both *SIN* and *WBO*, and *REMAV*. In general, sample correlations between pairs of independent variables are reduced, so they do not pose noticeable problems for the precision of our estimates.

4.2 Estimation results

In Table 6 we present the estimation results for the different variants of the regression model (1), *i.e*., using the average remuneration (*REMAV*) as the dependent variable and *SIN* as a proxy to gender diversity and including groups of explanatory variables separately.

In the first estimation (Model A), we only include control variables (*EDU*, *BOARD*, *EXEC*, *TA*, *LEV*, *NINC* and *CIN* whereas, in the second and third estimations, we also consider the two of the three main explanatory variables—*POLBO* in Model B and *POLBO* and *SIN* in Model C. In the fourth estimation (Model D), we add the third main explanatory variable—the moderating variable, *i.e.*, gender diversity, to the relationship between political connections and average remuneration (*POLBO*·*SIN*Finally, in the last estimation (Model E), we consider the variables under analysis in models A, B, C and D, now augmented with the interactions between time dummies and political connections and gender diversity (*D2*·*POLBO*, *D*1·*SIN* and *D*1·*SIN*·*POLBO*).

In order to assess our research hypotheses, we comment on these results, with a particular emphasis on the estimates of the impact of *POLBO* on *REMAV*, the effect of *SIN* upon the relationship between *POLBO* and *REMAV*, as well as the estimated impact of regulatory measures on boards' remunerations and gender diversity.

4.3 Discussion of empirical results

Firstly, we examine the relationship between remuneration and political connections. As we can observe in models B, C, D and E this relationship is negative and statistically significant at 5% in model B and at 1% significance level in the remaining models. Our results could suggest that directors with political connections are not driven by higher remuneration contracts but by other non-monetary incentives, such as prospects for political positions in the future. These results are in line with Fung and Pecha (2019), who find a negative relationship between political connections and remuneration, justifying the fact that these directors do not want to be associated with high remunerations, as they may want to assume political positions in the future and because high remunerations is perceived negatively in political circles. Our results are also in line with the clues left by García-Meca (2016), who finds a negative relationship but statistically insignificant. Moreover, the negative relationship between *REMAV* and *POLBO* may mean that directors with political connections often have lack industry experience in areas such as accounting, finance and corporate governance and serve in multiple directorships (Kang and Zhang 2018), not demanding high remunerations. Indeed, Zhang and Truong (2019) found that members with political connections are more often absent at board meetings than those without political connections, because they also belong to other boards. One other possible explication finds support in Agency Theory, as proposed by Jensen and Meckling (1976). As directors with political connections can use their political resources to promote their own interests (Ding et al. 2015), shareholders can mitigate these agency problems by monitoring remuneration policies (Dong and Ozkan 2008). Thus, this finding is in accordance with our research hypothesis H1.

Our second hypotheses analyzed firstly the relationship between gender diversity and boards' remuneration (H2a) and secondly the effect of gender diversity on the relationship between political connections and boards' remuneration (H2b). Our results suggest that gender diversity increases remuneration in line with O'Reilly and Main (2010) and Abdul et al. (2018), concluding that we did not reject the H2a hypothesis. Moreover, gender diversity in boards of eurozone banks accentuates the negative effect of political connections on remuneration. As shown in Table 6, gender diversity renders the impact of political connections more negative on average remuneration; *i.e.*, more women on the board accentuates the negative effect of political connections on remunerations, corroborating the hypothesis H2b. In light of Agency Theory, this result can be explained by the fact that, as female directors improve the board's control and monitoring, gender diversity may mitigate agency costs and conflicts of interest between directors with political connections and shareholders (Jurkus et al. 2011), which can reduce remunerations. Thus, shareholders reduce opportunistic behaviors due to political connections by monitoring

Table 5 Correlation matrix

	REMAV	*POLBO*	*SIN*	*WBO*	*EDU*	*BOARD*	*EXEC*	*TA*	*LEV*	*NINC*	*CIN*
REMAV	1										
POLBO	−0.1988***	1									
SIN	−0.1212***	0.2457***	1								
WBO	−0.0880**	0.2335***	0.9438***	1							
EDU	0.0827**	−0.0883**	−0.0021	0.0029	1						
BOARD	−0.2000***	0.3180***	0.4577***	0.3719***	−0.1866***	1					
EXEC	0.0838**	−0.1836***	−0.0123	−0.0678*	0.0859**	0.0504	1				
TA	0.3641***	0.3173***	0.0936**	0.1282***	−0.0935**	0.3552***	−0.0133	1			
LEV	0.1584***	−0.0352	−0.0758*	−0.0755*	−0.1136***	−0.1083***	0.1697***	0.0746*	1		
NINC	0.1546***	−0.1043**	0.0278	0.0156	0.0769*	−0.0507	0.1932***	0.0227	0.3720***	1	
CIN	0.2368***	0.0774*	−0.2340***	−0.1874***	0.0619	−0.2750***	0.0809**	0.3985***	0.1474***	0.0880**	1

Check Table 3 for description of variables

*p value < 0.10; **p value < 0.05; ***p value < 0.01

Table 6 Estimation results for Model (1); Gender diversity covariate: *SIN*

Dependent variable ($REMAV_i$):	*Model A*	*Model B*	*Model C*	*Model D*	*Model E*
Parameters' estimates and specification tests					
Parameters' estimates					
$REMAV_{i-1}$	0.721***	0.702***	0.685***	0.653***	0.653***
POLBO		−0.450**	−0.515***	−0.935***	−1.038***
SIN			0.633***	0.784***	0.932***
SIN·POLBO				−2.093***	−4.696***
D2·POLBO					0.054
D1·SIN					−0.228
D1·SIN·POLBO					3.101**
EDU	−0.981***	−0.907***	−0.658***	−0.572***	−0.358*
BOARD	−0.016*	−0.006	−0.036***	−0.036***	−0.030***
EXEC	−0.009	−0.023*	−0.026**	−0.059***	−0.062***
TA	−0.009	−0.006	0.004	0.050*	0.039
LEV	−0.031***	−0.027***	−0.017**	−0.029***	−0.031**
NINC	0.011*	0.010	0.007	0.007	0.009
CIN	−0.489	−0.187	0.913**	2.215***	1.976***
w_i: year dummies	Yes	Yes	Yes	Yes	Yes
Number of banks	69	69	69	69	69
Number of observations	541	541	541	541	541
Specification tests					
m_1	−4.810 (0.000)	−4.860 (0.000)	−4.810 (0.000)	−4.780 (0.000)	−4.790 (0.000)
m_2	−0.100 (0.923)	−0.170 (0.863)	−0.080 (0.934)	−0.240 (0.808)	−0.080 (0.939)
Hansen	32.950 (0.778)	33.680 (0.711)	39.070 (0.422)	35.690 (0.531)	32.980 (0.517)

m_i, $i=1, 2$, denotes a serial correlation test of order i, asymptotically distributed as a $\mathcal{N}(0, 1)$ random variate under the null hypothesis of no serial correlation; *Hansen* denotes the value of the test statistic for over-identifying restrictions, asymptotically distributed as a chi-squared random variate under the null hypothesis of no correlation between instruments and error term

Check Table 3 for description of variables

p values associated with tests statistics in parentheses; **p* value <0.10; ***p* value <0.05; ****p* value <0.01

remuneration policies (Dong and Ozkan 2008) and by including female directors (Jurkus et al. 2011). Together, these two measures have a negative impact in remuneration.

With regard to the effect of the three relevant measures issued during the period under study (introduction of gender quotas, Directive 2013/36/EU, and the direct supervision of ECB), we can conclude that these measures do not have any noticeable effect on the relationship between political connections and remuneration, and between gender diversity and remuneration. Thus, hypotheses H3a and H4 are rejected.

However, when analyzing the impact of the *D1* dummy (regarding the ECB gender quota and the Directive 2013/36/EU) upon the effect of gender diversity on the relationship between political connections and average remuneration (H3b), we conclude that this impact is positive. Thus, these measures alter the negative effect founded on our confirmation of hypothesis H2b. In view of the fact that the CRD IV Directive defines the principles of corporate governance, promotes diversity in board composition and defines the structure of remuneration policies, discouraging excessive risk-taking behavior, we believe that the restrictions on variable remuneration based on board member performance caused an increase in fixed remuneration, as documented by de Andrés et al. (2019). We believe that the CRD IV in remuneration legislation has more effect than gender quota in this positive impact. Indeed, gender quota increases gender diversity, but this increase accentuates the negative effect of political connections on remuneration as expressed in our hypothesis H2b. Furthermore, according to the signalling theory, remunerations increase after the regulatory measures (CRD IV and gender quota), because the market will view higher remunerations as justified by well-governed boards with gender diversity, experience, ethical concerns, and adequate levels of monitoring (Elnahass et al. 2022). In this way, we can conclude that hypothesis H3b is not rejected.

Given the above, the results obtained for hypotheses H3a and H3b are novel, in view of the current literature, and are challenging to interpret. Regarding H3a, in our opinion, D1 did not have a significant effect on gender diversity because we believe that its impact will only be perceptible in the years following the analysis of this study. Indeed, only in 2021, with the new Fit and Proper Guide, does the European Central Bank issue recommendations for the achievement of gender diversity goals in significant banks, or enforce their compliance in case of violations (European Central Bank 2021b). Nonetheless, in order to better grasp the meaning of the dummy covariate, D1, as well as its effect on the relationship between gender diversity and political connections (cfr. hypothesis H3b), we should stress that D1 signals the entry into force of both the gender quota directive and the CRD IV directive, which includes issues of gender diversity, remuneration, and suitability of directors. Doing a content analysis of CRD IV, it can be seen that this directive is more strongly linked to the issues of remuneration (the word "remuneration" appears 109 times in the text and the expression "remuneration policies" appears 26 times) and suitability of directors (the words "suitability", "good repute" and "reputation" appear 15 times), than to the issues of gender diversity ("gender" only appears 6 times in the text).

Thus, after 2013, we believe that CRD IV will have a greater impact on remuneration and suitability issues than on increasing gender diversity on boards. In this sense, following its implementation, women directors face a regulatory framework that supports conditioning of unethical practices and values remuneration not associated with risk, since this directive considers that remuneration assumes a predominant role.

In short, after 2013, women are able to impose higher remuneration policies on boards by increasing fixed remuneration that is not associated with risk and discretionary practices, mitigating the negative effect of directors with political connections who opportunistically prefer lower remuneration (thus contradicting the previous hypothesis H2b).

Regarding the impact of control variates on remuneration, firstly we note the negative impact of education level and average remuneration in all estimations. The higher the ratio of elements with MsC's and PhD's in the boards, the lower the total and average remuneration, because members with MsC's and PhD's are more risk-averse (Berger et al. 2014), which can affect remuneration policies. The board size has a negative effect on the average remuneration also, which makes sense because, as the number of board members (denominator of the average remuneration) increases, *ceteris paribus*, the average remuneration decreases. The number of executives in boards also impacts negatively average remuneration, as found by Cardinaels (2009). Fernandes (2008), who concluded that remunerations are higher when firms have more nonexecutive board members.

The bank size does not have a statistically significant effect at the 5% level on the average remuneration of boards, as documented by García-Izquierdo et al. (2018) and Karim (2020). Thus, the size of the bank will not influence the average remuneration of the boards. Leverage has a negative and statistically significant impact on remuneration. Thus, it is believed that banks with higher leverage ratios, *i.e*., lower capital ratios, being less resilient, may have lower remuneration for their board members. A high debt level is not a sign of solvency for the market (Tran et al. 2016). Regarding efficiency, the impact of *NINC* on remuneration is positive and only statistically significant at 10% for model A, suggesting that the greater the bank's efficiency, the higher the remuneration. The relationship between corruption control and average remuneration shows that the greater this control, the greater the remuneration of board members, which can be explained by the fact that countries with greater corruption control, have banks with higher returns (Chen et al. 2018) which may be taken into account in remuneration policies.

In all the estimated models described in Table 6, the lagged dependent variable's estimated coefficient is positive and statistically significant. This finding confirms the adopted models' dynamic character, under which, conditionally on remaining covariates, past remuneration positively affects current remunerations.

As a conclusion to the present subsection, we note that all adopted models seem correctly specified, for the following reasons: i) there is no evidence of second-order error autocorrelation ($m2$ statistic) at acceptable levels; ii) there is no clear evidence of a correlation between instruments and error terms (Hansen

statistic), since the null hypothesis that instruments are valid is not rejected at the 1% level. Moreover, we verify that there are no multicollinearity problems (VIF < 10, in Table 7 and Table 11 in the Appendix).

4.4 Robustness and additional results

To analyze the robustness of model 1, the percentage of women on the board (*WBO*) was considered as a proxy for gender diversity. The results of the four estimations, following the procedure explained above, are shown in Table 10 in the Appendix. As can be seen, the conclusions presented above regarding the variables of interest remain unchanged (effects of *POLBO*, *GD*, *POLBO·GD*, *D2·POLBO*, *D1·GD*, *D1·GD·POLBO* on *REMAV*).

Moreover, in order to address the possibility of a nonlinear (quadratic) functional relationship between *REMAV* and *POLBO*, we also considered the dynamic panel data model:

$$\begin{aligned} REMAV_{it} = {} & \beta_1 REMAV_{i,t-1} + \beta_2 POLBO_{it} + \beta_3 GD_{it} + \beta_4 GD_{it} POLBO_{it} \\ & + \beta_5 D1_t GD_{it} + \beta_6 D2_t POLBO_{it} + \beta_7 D1_t GD_{it} POLBO_{it} + \beta_8 POLBO_{it}^2 \\ & + \beta_9 GD_{it} POLBO_{it}^2 + \beta_{10} D2_t POLBO_{it}^2 + \beta_{11} D1_t GD_{it} POLBO_{it}^2 \\ & + \sum_{j=1}^{J} \theta_j X_{j_{it}} + u_{it} + v_i + w_t, \end{aligned} \tag{3}$$

where Greek letters, variables and indices have the same meaning as stated in subsection 3.3.1 above.

Given the fact that marginal effects are not constant under a quadratic functional form, these effects must now be estimated. To this effect we adopt two alternative customary procedures. Firstly, we compute average partial effects (APE's) that help us gauge the main directional impact of covariates on the dependent variable—in our case, the effect of *POLBO* on *REMAV*. We compute APE's both in general (for the whole sample period) and for each subsample, corresponding to $D2 = 0$ and $D2 = 1$ (respectively, before and as of the assessment of probity of boards' candidates by the ECB).[2] Secondly, we also estimate this marginal effect by evaluating the partial derivative $\partial REMAV/\partial POLBO$ at different values of *POLBO* (first and third sample quantiles—low and high political connections level, respectively), with *GD* at its sample value closer to zero (as described above, *GD* is a centered covariate), for $D2 = 0$ and $D2 = 1$.

The same procedures were adopted to estimate the impact of *GD* on marginal effect of political connections, calculating APE's (both in general, for the whole sample period, and for each subsample corresponding to $D1 = 0$ and $D1 = 1$), and

[2] This marginal effect corresponds in general to the partial derivative $\partial REMAV/\partial POLBO$ and it is given by $\beta_2 + \beta_4 GD_{it} + \beta_6 D2_t + \beta_7 D1_t GD_{it} + 2\beta_8 POLBO_{it} + 2\beta_9 GD_{it} POLBO_{it} + 2\beta_{10} D2_t POLBO_{it} + 2\beta_{11} D1_t GD_{it} POLBO_{it}$.

Table 7 Collinearity diagnostics

Variable	Variance inflation factor (VIF)
$REMAV_{t-1}$	1.19
POLBO	4.15
SIN	5.41
SIN·POLBO	5.12
D2·POLBO	3.51
D1·SIN	5.37
D1·SIN·POLBO	4.82
EDU	1.11
BOARD	2.25
EXEC	1.19
TA	2.47
LEV	1.30
NINC	1.23
CIN	1.71

Values > 10.0 may indicate a collinearity problem

Check Table 3 for description of variables

evaluating marginal effects at different values of *POLBO* (first and third sample quantiles), for $D1 = 0$ and $D1 = 1$.[3]

We present these results for model (3) in Table 8 with the APE's and the derivatives specified in the panel "Estimates of Marginal Effects". With regard to gender diversity, represented by *SIN*, considering the APE, we estimate a negative impact of *POLBO* on *REMAV*, statistically significant at 10%. Evaluating the partial derivatives of interest, we find the negative relationship only for high levels of political connections; for low levels of *POLBO* the impact of these connections on *REMAV* are negative, but not statistically significant. Thus, our APE's and partial derivatives of interest results are concordant with the linear conclusions. We can conclude that the high political connections negatively impact the average remuneration, either before the evaluation of the ECB's suitability or after.

Regarding the effect of gender diversity on the marginal effect of political connections, we can find a negative impact before the CRD IV and ECB gender quota, and in this period for high levels of political connections. This conclusion is in accordance with the results for the linear model, with gender diversity accentuating the negative effect of *POLBO* on *REMAV*. However, after these measures ($D1 = 1$) we find a positive impact, although not statistically significant for this subsample, but statistically significant for low levels of political connections. These results are concordant with those of the linear case because we found a positive effect of the *D1* on the effect of gender diversity in the relationship between political connections

[3] Corresponding to the cross partial derivative$\partial(\partial REMAV/\partial POLBO)/\partial GD = \partial^2 REMAV/\partial GD\partial POLBO$, given by $\beta_4 + \beta 7 D1_t + 2\beta_9 POLBO_{it} + 2\beta_{11} D1_t POLBO_{it}$.

and average remuneration. The nonlinear results show that the regulatory measures change the negative effect of gender diversity on the relationship of political connections in average remuneration to positive, when political connections are reduced.

The coefficients of the control variables have the expected signs and are already obtained in the linear results, although some are not statistically significant. The model is well estimated considering the specification tests. Finally, the results for APE's and the partial derivatives, when we consider the gender diversity represented by *WBO*, lose some significance. Still, we believe that this is not very relevant since, as we explained, the *SIN* variable is the one that best represents gender diversity, as it is more sensitive to diversity variations.

5 Conclusion

The present study aims at a deeper understanding of the effect of political connections on remuneration, as well as the impact of gender diversity on this relationship. Our results indicate a negative effect of political connections on average remuneration. This finding is in line with the notion that members with political connections seek other benefits at the expense of high remuneration, because in the future they may have other political positions, not wanting to be associated with high remuneration. Also, their usual lack of experience in the banking sector and the fact that they may belong to more than one board can hinder higher remunerations. Furthermore, shareholders can mitigate agency costs derived from political connections' personal interests through the remuneration policy.

Regarding the influence of gender diversity on the (negative) relationship between political connections and remuneration, we find that gender diversity accentuates this impact, *i.e.*, more women lead to lower remuneration. This result can be explained in light of Agency Theory, whereby shareholders reduce opportunistic behaviors due to political connections through the monitoring remuneration policies (Dong and Ozkan 2008) and through the inclusion of female directors (Jurkus et al. 2011). However, when we analyze the effect of the implementation of the CRD IV and the ECB's gender quota on the effect of gender diversity in the relationship between political connections and average remuneration, we find that these measures have led to a positive impact. This means that the Directive may have increased the fixed remuneration of the boards and banks want higher remunerations to signal the market that boards are well-governed and have experienced, diverse and ethical directors. Moreover, we believe that after 2013 women will be able to impose higher remuneration policies on boards by increasing fixed remuneration that is not associated with risk and discretionary practices, mitigating the negative effect of directors with political connections who opportunistically prefer lower remuneration, as remuneration assumes a predominant role. On the whole, these findings remain substantially unaltered when we allow for nonlinear relationships between political connections and average remuneration.

Table 8 Estimation results for Model (3); gender diversity covariate: SIN and *WBO*

Gender diversity (GD_t)	*SIN*	*WBO*
Parameters' estimates and specification tests		
Parameters' estimates		
$REMAV_{t-1}$	0.656***	0.698***
POLBO	−0.787***	−0.592
GD	0.389	0.559
GD·POLBO	−5.907**	−8.877*
D2·POLBO	0.267	0.945**
D1·GD	0.622	0.400
D1·GD·POLBO	8.230***	10.345***
$POLBO^2$	−1.242	0.078
$GD{\cdot}POLBO^2$	−0.666	11.574
$D2{\cdot}POLBO^2$	0.319	−3.062**
$D1{\cdot}GD{\cdot}POLBO^2$	−14.110*	−26.405*
EDU	−0.521***	−0.655***
BOARD	−0.035***	−0.048***
EXEC	−0.043***	−0.009
TA	0.036	0.068**
LEV	−0.007	−0.017
NINC	−0.0002	0.004
CIN	1.070**	0.156
w_t: year dummies	Yes	Yes
Number of banks	69	69
Number of observations	541	541
Specification tests		
m_1	−4.880 (0.000)	−4.690 (0.000)
m_2	−0.110 (0.911)	0.160 (0.871)
Hansen	39.160 (0.417)	39.890 (0.386)
Estimates of marginal effects		
Marginal effect of political connections on remuneration ($\partial REMAV/\partial POLBO$)		
APE, full sample period (2011–2019)	−0.731**	0.071
APE, subsample with $D2=0$ (2011–2013)	−0.703*	−0.428
APE, subsample with $D2=1$ (2014–2019)	−0.741**	0.230
Derivative at $D2=0$, high *POLBO*, $GD \approx 0$	−0.944***	−0.586*
Derivative at $D2=0$, low *POLBO*, $GD \approx 0$	−0.520	−0.612
Derivative at $D2=1$, high *POLBO*, $GD \approx 0$	−0.627***	−0.0002
Derivative at $D2=1$, low *POLBO*, $GD \approx 0$	−0.302	0.998**
Impact of gender diversity on marginal effect of political connections ($\partial^2 REMAV/\partial GD\partial POLBO$)		
APE, full sample period (2011–2019)	1.346	0.245
APE, subsample with $D1=0$ (2011–2012)	−4.938*	−7.655*
APE, subsample with $D1=1$ (2013–2019)	1.346	0.245
Derivative at $D1=0$, high *POLBO*	−5.209***	−6.653**
Derivative at $D1=0$, low *POLBO*	−4.431	−9.470

Table 8 (continued)

Gender diversity (GD_t)	*SIN*	*WBO*
Derivative at $D1 = 1$, high *POLBO*	−0.200	−1.140
Derivative at $D1 = 1$, low *POLBO*	4.168**	2.762

p values associated with tests statistics in parentheses; **p* value < 0.10; ***p* value < 0.05; ****p* value < 0.01

m_i, $i = 1, 2$, denotes a serial correlation test of order i, asymptotically distributed as a $\mathcal{N}(0, 1)$ random variate under the null hypothesis of no serial correlation; *Hansen* denotes the value of the test statistic for over-identifying restrictions, asymptotically distributed as a chi-squared random variate under the null hypothesis of no correlation between instruments and error term. Check Table 3 for description of variables

Our study contributes to the growing literature on political connections and gender diversity, offering a deeper understanding of remuneration determinants for banks' board members. These results may be useful for the Regulator as a means to better understand the possible limitations and benefits of its two impositions. In addition, the results obtained may be useful to assess whether the Regulator's emanations are being beneficial (or not) for a sector as important to the economy as the banking sector. Besides, they may also be a source of knowledge for the European Union, about the assessment of Directive 2013/36/EU (CRD IV).

Nonetheless, the study is not exempt from some limitations, namely because of the lack of available data. For the latter reason, we did not take into consideration either the separation of remuneration into its different components or additional controls of boards' characteristics. Furthermore, as a matter of choice, our study only considers banks affected by ECB regulations and supervision; in a future study, it would be interesting to consider a quasi-natural experimental design, with a control group of banks, examine the impact of political connections and gender diversity on the components of director remuneration (e.g., cash, bonuses, options) and control other board characteristics. This analysis can also prove of interest for less significant banking institutions, as well as for other sectors of activity, outside the banking sector. It would be equally interesting to study the effect of risk-adjusted performance on board remuneration.

Appendix

See Tables 9, 10 and 11.

Table 9 Fisher-type unit root test

Variable	Test statistic
REMAV	397.845***
POLBO	165.782*
SIN	461.694***
WBO	168.927**
EDU	197.144***
BOARD	442.560***
EXEC	468.330***
TA	194.829***
LEV	699.364***
NINC	299.473***
CIN	265.459***

Null hypothesis, H_0: presence of unit root; rejection of H_0 indicates stationarity

Check Table 3 for description of variables

*p value < 0.10; **p value < 0.05; ***p value < 0.01

Table 10 Estimation results for Model (1); gender diversity covariate: *WBO*

Dependent variable ($REMAV_t$):	*Model A*	*Model B*	*Model C*	*Model D*
Parameters' estimates and specification tests				
Parameters' estimates				
$REMAV_{t-1}$	0.721***	0.737***	0.731***	0.720***
POLBO		−0.291	−0.296	−0.751**
WBO		0.541***	0.557***	1.068*
WBO·POLBO			−0.792***	−8.139***
D2·POLBO				0.329
D1·WBO				−0.600
D1·WBO·POLBO				6.890***
EDU	−0.981***	−0.843***	−0.853***	−0.748***
BOARD	−0.016*	−0.043***	−0.043***	−0.037***
EXEC	−0.009	0.004	0.001***	−0.008
TA	−0.009	0.051**	0.057**	0.069**
LEV	−0.031***	−0.019*	−0.023*	−0.026*
NINC	0.011*	0.002	0.003	0.007
CIN	−0.489	−0.176	−0.074	0.147
w_t: year dummies	Yes	Yes	Yes	Yes
Number of banks	69	69	69	69
Number of observations	541	541	541	541
Specification tests				
$m1$	−4.810 (0.000)	−4.800 (0.000)	−4.800 (0.000)	−4.770 (0.000)
m_2	−0.100 (0.923)	0.040 (0.966)	0.040 (0.969)	0.190 (0.852)
Hansen	32.950 (0.778)	40.550 (0.359)	40.530 (0.317)	37.700 (0.304)

m_i, $i=1$, 2, denotes a serial correlation test of order i, asymptotically distributed as a $\mathcal{N}(0,1)$ random variate under the null hypothesis of no serial correlation; *Hansen* denotes the value of the test statistic for over-identifying restrictions, asymptotically distributed as a chi-squared random variate under the null hypothesis of no correlation between instruments and error term

Check Table 3 for description of variables

p values associated with tests statistics in parentheses; *p value <0.10; **p value <0.05; ***p value <0.01

Table 11 Collinearity diagnostics

Variable	Variance inflation factor (VIF)
$REMAV_{t-1}$	1.78
POLBO	4.33
WBO	7.05
WBO·POLBO	8.00
D2·POLBO	3.61
D1·WBO	6.98
D1·WBO·POLBO	7.48
EDU	1.11
BOARD	2.11
EXEC	1.21
TA	2.49
LEV	1.29
NINC	1.23
CIN	1.72

Values > 10.0 may indicate a collinearity problem

Check Table 3 for description of variables

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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