When do women on board of directors reduce bank risk?

Giuliana Birindelli, Helen Chiappini and Marco Savioli

Abstract

Purpose – *This study aims to examine the relationship between female directors and bank risk. In particular, whether such a relationship varies across sound or unsound banks and with or without a critical mass of female directors is tested.*

Design/methodology/approach – *Using a sample of 215 listed banks from 40 countries over the period 2008–2016, this study carries out panel data analyses and tests all the model specifications on four different measures of risk (common equity ratio, leverage, NPLs ratio and price volatility).*

Findings – *The findings show that increasing the number of female directors does not reduce bank risk when banks are unsound. When banks are sound, female directors have a significant and positive role in reducing risk, only until reaching a critical mass of women.*

Practical implications – *This study provides useful corporate governance indications for policymakers and practitioners. Advantages of gender diversity on boards are recognized especially in sound banks, but increasing the number of women directors beyond the critical mass may not lead to lower risk. In fact, ethical or legal pressures aimed at increasing gender diversity on boards (i.e. soft or hard gender quotas) may cause undesired effects on bank risk, especially if female directors are not chosen on merit and skills. Moreover, gender-balanced boards, namely, with a ''dual critical mass,'' seem to assure more effective decision-making processes.*

Originality/value – *This study provides empirical evidence on female board members and risk minimization, differentiating between sound or unsound banks. Furthermore, this study contributes to the literature on the critical mass of women on the board of directors by testing this theory for these two categories of banks.*

Keywords *Bank risk, Corporate governance, Female directors, Critical mass of women*

Paper type *Research paper*

1. Introduction

In recent years, two main factors have pushed for greater gender balance on bank boards of directors: the global financial crisis (García-Meca *et al.*, 2015) and a growing ethical pressure (Mateos de Cabo *et al.*, 2012). The global financial crisis underscored the failure of corporate governance mechanisms (The High-Level Group on Financial Supervision in the European Union, 2009) and has consequently created a driver to strengthen such mechanisms through more diversified boards, at least in terms of age, professional experience and gender (Basel Committee on Banking Supervision, 2015). Gender balance may foster sound decision-making processes by expanding the views and experiences of management bodies and reducing the risk of male "group-think," which was an important factor behind the crisis (see, among others, the Directive 2013/36/EU). In addition, growing ethical pressure makes the claim that gender diversity is a desirable factor itself (Mateos de Cabo *et al.*, 2012), and that women should not be excluded from a firm's top positions. In response to this, many governments have issued laws establishing gender quotas (e.g. France, Italy, Norway and Spain) or have supported greater representation through national corporate governance codes (e.g. Austria, Germany and Ireland).

Giuliana Birindelli is based at the Department of Management and Business Administration, Gabriele d'Annunzio University of Chieti and Pescara, Pescara, Italy. Helen Chiappini is based at the Department of Management and Business Administration, Gabriele d'Annunzio University of Chieti and Pescara, Pescara, Italy. Marco Savioli is based at Department of Economics, University of Salento, Lecce, Italy and Rimini Centre for Economic Analysis, Milano, Italy.

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A relevant academic debate also emerged around the topic of women and firm performance (Darmadi, 2013; Pathan and Faff, 2013; Faccio *et al.*, 2016; Sila *et al.*, 2016; Terjesen *et al.*, 2016; Bhat *et al.*, 2019; Yang *et al.*, 2019; Ye *et al.*, 2019; Fernández-Temprano and Tejerina-Gaite, 2020; Greene *et al.*, 2020; Hurley and Choudhary, 2020). Few studies analyze the relationship between female directors and bank risk (Berger *et al.*, 2014; Palvia *et al.*, 2015; Farag and Mallin, 2016; Owen and Temesvary, 2018) though there is growing attention to improved monitoring of decisions by management bodies by means of adequate representation of women (Basel Committee on Banking Supervision, 2015; EBA-European Banking Authority and ESMA-European Securities and Markets Authority, 2018).

Based on a sample of 215 listed banks from 40 countries over the period 2008–2016, we examine whether the relationship between female directors and risk is different in either sound or unsound banks and whether a critical mass of female board members influence bank risk. We assume that the impact of gender diversity is context-dependent, as it depends on bank and board characteristics (Owen and Temesvary, 2018; Groening, 2019). In particular, drawing inspiration from the recent study by Owen and Temesvary (2018) on US banks, we believe that female board members are mostly able to play a pivotal role in sound banks. Furthermore, we assume that their role changes when there is a critical mass of women on the board of directors (Kanter, 1977a, 1977b). In fact, when there is more than a certain number of women sitting on a board a threshold or critical mass is reached (Joecks *et al.*, 2013) and they no longer hold a "symbolic status" and can influence the dynamics and the decisions within the board.

We use four measures of risk (common equity ratio, leverage, NPLs ratio and price volatility) to differentiate our banks with respect to bank soundness. These measures are linked to corporate governance mechanisms. A high level of risk – especially when not accompanied by high returns – is strictly connected with management and corporate governance failure. To validate our choices, we investigated whether our categorization of sound/unsound banks is consistent with other variables that emerge in the literature (DeYoung, 1998) as related to corporate governance mechanisms: return on assets (ROA) and deposits on loans ratio, respectively indicators of profitability and liquidity/funding. The results on tests of differences between means (available upon request) show that the banks we identified as sound significantly outperform the unsound, both in terms of ROA and deposits on loans ratio.

Our findings show that, when the critical mass of women has not been reached, the sign of the relationship between female directors and risk is negative for sound banks and not significant (or slightly positive) for unsound banks. Once there is a critical mass of women on the board, the relationship with risk is not significant. In addition to the heterogeneity between sound and unsound banks, our results confirm a non-linear effect of female directors on bank risk. The results are robust across the many specifications considered: sample splits relating to different meaningful geographical areas and allowing for endogeneity of sound/unsound bank categorization and of female directors.

This study contributes to the ongoing debate over the link between gender balance on the board of directors and bank risk in several ways. First, to the best of our knowledge, there are no studies on the relationship between gender diversity and risk analyzed in sound/unsound banks. Second, we consider a panel of listed banks from 40 countries, while previous studies on female directors and risk concentrate on specific geographical areas, with a majority of studies focused on US banks (Muller-Kahle and Lewellyn, 2011; Palvia *et al.*, 2015; Owen and Temesvary, 2018) or on specific countries (Berger *et al.*, 2014; Skała and Weill, 2018). Finally, we contribute to the literature on critical mass theory (Kanter, 1977a, 1977b) by testing this theory for sound and unsound banks.

The remainder of the paper is organized as follows. Section 2 discusses the literature review and develops the research hypotheses. Section 3 presents the research design, whereas Section 4 shows results and discussion. Section 5 concludes and highlights future research lines.

2. Theoretical background and hypotheses development

This section provides the theoretical background driving the hypotheses developed for our study.

2.1 Women, risk-taking and bank soundness

A large body of literature considers behavioral differences between women and men, including a focus on their risk-taking attitude both in personal and managerial decision-making. Research shows that women are generally more risk-averse than men in personal financial investments (Jianakoplos and Bernasek, 1998; Sunden and Surette, 1998; Barber and Odean, 2001; Dwyer *et al.*, 2002; Agnew *et al.*, 2003; Watson and McNaughton, 2007). An insightful overview of reasons explaining female risk aversion has been recently provided by Hurley and Choudhary (2020). Some of the primary reasons are emotional factors that negatively impact female utility and in turn their risk-attitude (Brody, 1993; Croson and Gneezy, 2009) and the greater confidence males have compared to females (Barber and Odean, 2001).

Gender differences in risk-attitude are reduced, however, when women possess financial skills (Gysler *et al.*, 2002) or when they are managers and professionals (Johnson and Powell, 1994; Maxfield *et al.*, 2010). Other studies support the idea that women with careers in finance have similar attitudes to risk (Croson and Gneezy, 2009) or are even more prone to risk-taking than their male counterparts (Sapienza *et al.*, 2009; Bandiera *et al.*, 2011).

Another stream of theoretical and empirical literature more specifically focuses on the gender diversity of the board of directors. From a theoretical perspective, the benefits of gender diversity are discussed in relevant economic and psychological theories explaining the nature of the relationship between board gender representation and firm performance.

The agency theory (Jensen and Meckling, 1976; Fama, 1980) is based on the assumption that boards can perform their monitoring role better – protecting interests of shareholders and minimizing the conflicts of interest between agents (managers) and principals (shareholders) – when they are highly independent. Indeed, diversified boards achieve higher independence and, thus, provide better monitoring (Carter *et al.*, 2003). In particular, women directors seem to be severe controllers and provide strong oversight also on risk management, contributing to a more effective and better corporate governance (Mathew *et al.*, 2016). Agency problems might also be minimized because women help establish positive links with public bodies and social stakeholders (van der Walt and Ingley, 2003), which improves the monitoring over managers in terms of both time spent on control and quality of oversight (Adams and Ferreira, 2009; Gul *et al.*, 2011; Benkraiem *et al.*, 2017). The resource based theory, in turns, supports the idea that organizations need a set of resources to survive in a complex environment, especially if the level of competition is high. Thus, gender diversity allows firms to enhance their set of information with broader perspectives, new skills and competences and more long-term and stakeholder-oriented views, as well as a better understanding of the marketplace and improved problem-solving capacity and overall strategic decision-making (Forbes and Milliken, 1999). Hence, there can be positive effects in terms of image and reputation in the market (Hillman *et al.*, 2007).

Other theories argue that the potential benefits of women may be limited or even absent. In particular, social identity theory (Turner and Haslam, 2001) suggests that individuals conduct a self-categorization process based on observable and relevant aspects related to different groups – such as gender (Rothbart and John, 1985; Turner *et al.*, 1987). Therefore, based on similarities and differences between subgroups within the same group, in-groups and out-groups – made up of integrated members and outsiders respectively – are created. Since women on boards are under-represented compared to men, female directors constitute the out-groups, while male directors the in-groups. The categorization influences the interaction among the individuals. Among the in-group members, there is a favourable attitude towards collaboration and communication. On the contrary, the categorization may create barriers to cooperation and competitive behavior toward out-group members (Joshi and Jackson, 2003). If that is the case, disagreement among the directors, difficulties in communication and conflictual attitudes on the board negatively impact decision-making process and firm performance.

Consistent with the above-mentioned theoretical frameworks, empirical studies on women-risk relationship find mixed results exploring the link between women and risk-taking over unregulated and regulated industries – including banks.

The empirical research on firms belonging to unregulated industries shows mixed results about the impact of female directors on firm risk-taking. The findings show a negative relationship (Darmadi, 2013; Alves *et al.*, 2015; Nadeem *et al.*, 2019), a positive relationship (Adams and Funk, 2012) and a not significant relationship (Matsa and Miller, 2013; Sila *et al.*, 2016; Fernández-Temprano and Tejerina-Gaite, 2020).

There is little literature that addresses the relationship between women and risk-taking in regulated industries and specifically, in the banking industry. Few studies, actually, consider the impact of female directors on bank risk-taking (Muller-Kahle and Lewellyn, 2011; Berger *et al.*, 2014; Adams and Ragunathan, 2015; the International Monetary Fund – IMF, 2017; Cardillo *et al.*, 2020). Most studies recognize a negative link (Muller-Kahle and Lewellyn, 2011; IMF, 2017; Cardillo *et al.*, 2020). Muller-Kahle and Lewellyn (2011) report that U.S. banks involved in subprime lending have boards made up of a large male majority and the IMF (2017) shows similar results across banks in 72 countries: women on the board of directors are associated with higher *z*-scores and lower levels of non-performing loans (NPLs). Recently, Cardillo *et al.* (2020), studying a sample of European listed banks, find that board gender diversity reduces the probability of bank bailout. In contrast with these findings, Berger *et al.* (2014) provide evidence that female executives drive the increasing level of German bank risk. Likewise, Adams and Ragunathan (2015) show that banks with more female directors do not undertake fewer risky activities or exhibit less risk.

A possible explanation for these varying results might be offered by arguments that the impact of gender diversity is context-dependent (Palvia *et al.*, 2015; Skała and Weill, 2018) or contingent on firm characteristics (Groening, 2019). In this vein, the study conducted by Owen and Temesvary (2018) on U.S. holding companies supports the claim that female directors work better in well-capitalized banks and argues that costs of internal conflicts and benefits of diversification shown in relevant literature (Chattopadhyay and Duflo, 2004; Freeman and Huang, 2015) are optimized when banks are well-capitalized. Specifically, Owen and Temesvary (2018) find a positive relationship with a measure of risk-adjusted return of assets (the Sharpe ratio) beyond a threshold of female directors serving on board (see Section 2.3). This relationship is verified for well-capitalized banks, while for the others the relationship is not significant. Following this line of research, we intend to analyze if women might have a different effect on bank risk according to the soundness of the bank.

Hence, we formulate the following hypothesis:

H1. The effect of female directors on bank risk-taking depends on bank soundness.

2.3 Critical mass of women, risk and bank soundness

Considering studies that find a non-linear relationship between women and bank risk (Farag and Mallin, 2017; Owen and Temesvary, 2018), we decide to follow the critical mass theory to test whether differences supposed under *H1* are recognized when a bank board reaches a critical mass of female directors (Kanter, 1977a, 1977b).

Boards of directors can be balanced or unbalanced in terms of gender and they often assume a form of skewed distribution, characterized by a male directors majority over a female minority. Thus, women are a "token in the midst of numerical dominants" (Kanter, 1977b, p. 970) and they assume a symbolic role, instead of a concrete and driving function. However, when women sitting on boards are more than a certain "magic" number and achieve a threshold or critical mass (Joecks, *et al.*, 2013), they can leave their "symbolic status" behind and positively influence the dynamics and the decisions within the board. Based on the critical mass theory, some studies (Konrad and Kramer, 2006; Konrad *et al.*, 2008) point out that the positive influence of women on boards is realized with at least three women serving on the board. In sum, an absolute number of at least three women on the board is necessary to exert significant power on board activeness and to significantly change the board's dynamics and the processes.

Empirical research spreads across bank financial performance and risk (Farag and Mallin, 2017; Owen and Temesvary, 2018) with no conclusive results: sometimes findings show a U-shaped relationship between bank financial performance/financial fragility and women on board, others reveal an inverted U-shape. The results change according to the type of board considered (management board, supervisory board and board of directors; Farag and Mallin, 2017) or the level of capitalization of banks (Owen and Temesvary, 2018). Considering these findings, we posit the following hypothesis:

H2. The effect of female directors on bank risk-taking is not linear.

3. Research design

3.1 Sample and data collection

The sample of banks examined in this study consists of 215 listed banks from 40 countries [1] over the period 2008–2016. We explored the universe of listed banks given the few studies (IMF, 2017) that tackle such wide area and our final sample includes the most representative and largest banks listed in worldwide financial markets.

To define the sample, first we considered banks publicly traded during the selected years according to Thomson Reuters Business Classification, then we dropped banks for which data on governance are not available in the Eikon Thomson Reuters Environmental, Social and Governance (ESG) Score and banks with no financial data available in the Thomson Reuters Datastream. Hence, we reached to our sample by considering the banks which provide the information for our variables.

We collected data on the bank's governance and financial characteristics from different sources: governance variables (board size, independent directors, CEO duality, board tenure and board meetings) were obtained from Eikon Thomson Reuters ESG Score, while financial variables (bank size, ROA, loans ratio and deposits ratio) were from the Thomson Reuters Datastream. For country controls, we collected data on gender quotas and on gross domestic product (GDP). The information on gender quotas (hard and soft) were hand collected from two sources: Deloitte (2017) Report on board diversity and European Corporate Governance Institute (2018). Data on GDP were from World Bank.

3.2 Dependent variables

We use both accounting-based measures and market-based measures as a proxy for bank risk. Accounting-based measures include common equity ratio, leverage ratio and NPLs ratio, while price volatility is representative of market-based measures of risk (Table 1).

Common equity ratio is a regulatory capital constructed as common equity to risk-weighted assets. Leverage is a ratio between Tier 1 capital and total assets, and it represents a proxy for the Basel 3 leverage ratio. These two ratios measure bank stability: the higher the ratio, the greater the stability. In line with Vallascas *et al.* (2017) and Kutubi *et al.* (2018), we multiply the common equity ratio and leverage ratio by (−1) to interpret these variables as risk variables. This also makes it easy to compare the sign of the coefficients of the models for common equity ratio and leverage ratio with the sign of the coefficients of the models for NPLs ratio and price volatility. Capital ratios and leverage ratio are extensively used as a proxy for bank risk (Beltratti and Stulz, 2012; Mateos de Cabo, 2012; Palvia *et al.*, 2015; Skała and Weill, 2018).

Table 1 Variables

Variable	*Measurement*	*Expected sign*
Panel A: dependent variables		
CE Ratio (Common equity ratio)	(−1) Common equity as percentage of risk weighted assets	/
Leverage	(−1) Tier 1 capital as percentage of total assets (proxy for the Basel 3 leverage ratio)	/
NPLs (Non-performing loans ratio)	Non-performing loans as percentage of total loans	/
Price Volatility	Average annual stock's price volatility	/
Panel B: independent variables		
Female Directors	Total number of female directors serving on the board of directors divided by the total number of board members	Non-linear
Mass (Critical mass of female directors)	Dummy variable that takes the value 1 if three or more female directors serve on the board of directors, 0 otherwise	Positive/negative
Board size	Total number of directors on the bank's board	Positive/negative
Independent Directors	Percentage of independent directors sitting on the board of directors	Positive/negative
CEO Duality	Dummy variable that takes the value 1 if the CEO is also the chairman of the board, 0 otherwise	Positive/negative
Tenure (Board tenure)	Average number of years each board member has been on the board	Negative
Meetings (Board meetings)	Number of board meetings during the year	Negative
Bank size	Total assets of the bank (expressed in Euro)	Positive/negative
ROA (Return on assets)	Net income as percentage of total assets	Positive/negative
Loans Ratio (Loans to total assets)	Loans as percentage of total assets	Positive/negative
Deposits Ratio (Deposits to total assets)	Deposits as percentage of total assets	Negative
Hard Quotas (Hard Gender quotas)	Dummy variable that takes the value 1 if the country has established gender quotas for female representation on the board of directors by binding regulation, 0 otherwise	Positive
Soft Quotas (Soft Gender quotas)	Dummy variable that takes the value 1 if the country has recommended gender quotas for female representation on the board of directors by non-binding regulation within codes of corporate governance, 0 otherwise	Negative
GDP (Gross domestic product)	Country gross domestic product (at purchasing power parity) per capita	Positive/negative

NPLs ratio is constructed as a percentage of NPLs to total loans and is used in several studies as a proxy for bank credit risk (Chen and Lin, 2016; Farag and Mallin, 2017).

However, accounting-based measures are backward-looking and may be affected by accounting manipulations (Vallascas *et al*., 2017), thus we also use a market-based measure of risk – the price volatility – as in the literature (Pathan, 2009; Erkens *et al*., 2012; Khan and Vieito, 2013; Sila *et al*., 2016; Battaglia and Gallo, 2017; Vallascas *et al*., 2017).

3.3 Independent variables

We use two measures to capture the effect of women on bank risk: the percentage of female directors sitting on the board of directors and a dummy variable that takes the value 1 when three or more female directors serve on the board (Joecks *et al*., 2013) (Table 1).

We rely on the primary literature to identify, for our empirical model, several governances, financial and country controls.

As governance controls, we include board size (Berger *et al*., 2014), independent directors (Sila *et al*., 2016), CEO duality (Palvia *et al*., 2015), board tenure (Farag and Mallin, 2016) and board meetings (Terjesen *et al*., 2016). As financial controls, we include bank size (Pathan, 2009), return on assets (Iqbal *et al*., 2015), loans to total assets (Vallascas *et al*., 2017) and deposits to total assets (Berger *et al*., 2014). We winsorize the accounting variables to reduce the impact of not credible outliers, as in Faccio *et al*. (2016) and Sila *et al*. (2016). As country controls, we comprise hard and soft gender quotas (Terjesen *et al*., 2014), to distinguish between female representation on boards that resulted from laws (hard quotas) or codes of corporate governance (soft quotas). Scholars have used these variables in a few studies (Matsa and Miller, 2013). We also include gross domestic product as country control (Beltratti and Stulz, 2012). Finally, we use year dummies to account for international economic cycle.

3.4 Descriptive statistics

Table 2 presents the descriptive statistics of our data. On average female directors represent 15.5% of the board of directors, with a maximum representation of 60.0% and a

Table 2 Descriptive statistics

Variable	*Observations*	*Mean*	*SD*	*Minimum*	*Maximum*
CE Ratio	990	0.148	0.054	0.019	0.420
Leverage	968	0.073	0.028	0.010	0.216
NPLs	995	0.030	0.034	0.001	0.341
Price Volatility	983	0.258	0.081	0.104	0.690
Female Directors	1,015	0.155	0.114	0	0.600
Mass	1,015	0.314	0.464	0	1
Board Size	1,015	13.022	3.801	5	28
Independent Directors	1,015	0.577	0.261	0	1
CEO Duality	1 015	0.539	0.499	0	1
Tenure	1,015	7.457	3.963	0.500	19.310
Meetings	1,015	12.641	8.808	2	68
Bank Size	1,015	415,600,000	694,700,000	2,848,683	4,402,000,000
ROA	1,015	0.013	0.010	−0.060	0.067
Loans Ratio	1,015	0.631	0.136	0.026	0.963
Deposits Ratio	1,015	0.627	0.172	0.083	0.892
Hard Quotas	1,015	0.124	0.330	0	1
Soft Quotas	1,015	0.365	0.482	0	1
GDP	1,015	36,275.211	19,616.061	3,485	129,350

minimum of 0%. In 31.4% of cases, banks reach a critical mass of at least three female directors sitting on boards.

Table 3 reports the correlations of variables included in the estimation. More in detail, female directors and mass result negatively correlated with dependent variables, apart from leverage. Interestingly, women on the board are positively associated both with bank size and quotas (hard and soft), suggesting that banks whose boards are served by more female directors are larger and operate in countries where gender quotas are set.

3.5 Methodology

The next section will test our hypotheses using panel data analysis in order to control for omitted/unobserved variable bias. Fixed effects panel regression models are presented. The choice of fixed effects (over random effects) models relies on the significant results of the Hausman tests run on all the presented specifications: in this case, fixed effects are preferable since they are consistent (Baltagi, 2011). To obtain robust results, we test all the model specifications on four dependent variables (common equity ratio, leverage, NPLs ratio and price volatility). All the explanatory variables are lagged by 1 year to reduce possible residual endogeneity. Natural logarithmic transformations of the five numerical (non-index) variables (board size, tenure, meetings, bank size and GDP) are used to better approximate a normal distribution and overcome a possible problem of heteroskedasticity. We represent sound and unsound banks through the bank's level of risk: sound banks show a level of risk below the median risk, while unsound banks are characterized by a level of risk above the median. Therefore, we introduce a dummy variable median (m_Y), that takes the value 1 when the risk (measured in terms of Y = CE ratio, leverage, NPLs ratio, price volatility) is above the sample median and 0 when the risk is below the sample median. In this way, the coefficient of female directors is differentiated for sound/unsound banks (on the left/on the right of each column in Table 5 and following). Finally, robust standard errors of the estimated coefficients are clustered at the bank level and year dummies and constant are included.

In the robustness check subsection, dynamic panel estimations are also presented. Building on the work of Arellano and Bover (1995), Blundell and Bond (1998) develop a system estimator of linear dynamic panel data models that uses additional moment conditions. All the estimated specifications have first-differenced residuals that are not significantly autocorrelated from the second order onwards (Arellano-Bond test). The estimates are produced with the two-step GMM system estimator (Blundell and Bond, 1998) and Windmeijer's (2005) finite-sample correction for standard errors is employed. As before, all specifications include year dummies and a constant. The dynamic specification of these models account for the potential residual endogeneity that can bias the results of the static specifications. However, a potential final criticism regarding endogeneity could maintain that female directors and the bipartition of the sample done on m_Y may not be strictly exogenous. By construction, shocks today in the bank's risk might affect future values of female directors and bank categorization done on m_Y. Thus, these variables are treated as predetermined: lags of female directors and m_Y are used as instruments for them.

4. Results and discussion

Table 4 presents the results of the model that relates female directors to bank risk-taking with a simple linear relation, over the period 2008–2016 and across 40 countries. Results show that there is no statistically significant relationship between female directors and bank risk-taking. This finding is consistent for all the considered measures of bank risk: equity ratio, leverage ratio, NPLs ratio and price volatility. This evidence is, moreover, consistent with the recent studies by Farag and Mallin (2017) and Owen and Temesvary (2018).

Table 3 Correlations

Variable	*1.*	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*	*8.*	*9.*	*10.*	*11.*	*12.*	*13.*	*14.*	*15.*	*16.*	*17.*	*18.*
1. CE Ratio	1																	
2. Leverage	0.1961***	1																
3. NPLs	0.0068	−0.0023	1															
4. Price Volatility	0.1799***	0.0841**	0.4042***	1														
5. Female Directors	−0.0743**	0.1649***	−0.0846***	−0.1517***	1													
6. Mass	−0.0101	0.2554***	−0.0835***	−0.1718***	0.7554***	1												
7. Board Size	0.2662***	0.2895***	0.0166	−0.0252	0.0705**	0.2989***	1											
8. Independent Directors	−0.0804**	−0.0752**	−0.1123***	−0.2568***	0.2316***	0.1138***	−0.0733**	1										
9. CEO Duality	−0.0527*	−0.0468	0.1880***	0.1695***	−0.0234	−0.0890***	0.0261	0.0458	1									
10. Tenure	0.003	−0.3365***	−0.2456***	−0.3724***	−0.0128	−0.0747**	0.043	0.2648***	0.1170***	1								
11. Meetings	0.0516	0.0239	0.0771**	0.1433***	−0.0954***	−0.0635**	−0.1945***	−0.2345***	−0.0808**	−0.2165***	1							
12. Bank Size	0.1488***	0.4212***	−0.0113	0.0271	0.1445***	0.2189***	0.3210***	−0.0483	−0.0567*	−0.2611***	−0.0218	1						
13. ROA	−0.1576***	−0.2717***	−0.2489***	−0.0814**	−0.0850***	−0.0628**	−0.1419***	−0.1451***	−0.1598***	0.0483	0.0796**	−0.2197***	1					
14. Loans Ratio	0.0936***	−0.3140***	0.1613***	0.0039	−0.1028***	−0.1395***	−0.1950***	−0.0072	0.0461	0.0921***	0.0379	−0.5111***	0.1343***	1				
15. Deposits Ratio	−0.0091	−0.4430***	−0.2175***	−0.2652***	−0.1486***	−0.1578***	−0.1794***	0.0317	−0.2455***	0.2071***	−0.0399	−0.3393***	0.07**	0.2931***	1			
16. Hard Quotas	0.1220***	0.1833***	0.1389***	0.0157	0.0970***	0.0476	0.027	−0.1321***	−0.0234	−0.0536*	0.1321***	0.0444	−0.0889***	0.0641**	−0.1688***	1		
17. Soft Quotas	−0.1925***	−0.1764***	−0.0585*	−0.1172***	0.2022***	0.1002***	−0.1196***	0.2083***	0.2242***	0.0998***	−0.1831***	−0.0946***	−0.0794**	−0.0104	0.0616**	−0.2851***	1	
18. GDP	−0.1418***	0.0017	−0.0391	−0.2331***	0.0756**	0.0022	−0.0791**	0.3969***	0.2057***	0.2798***	−0.2258***	−0.029	−0.3663***	−0.0264	−0.0864***	−0.1063***	0.3643***	1

Notes: Significance levels: $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Drawing inspiration from the study of Owen and Temesvary (2018), we test whether the relationship between female directors and bank risk-taking depends on bank soundness (*H1*). Table 5 provides the findings of models including the interaction between female directors and a sound bank identifier. Results show that the relationship between female directors and bank risk is negative when banks are sound. By contrast, when banks are unsound the relationship is positive, but losing significance when the dependent variable is NPLs ratio or price volatility. Given these results, the impact of female directors on bank risk is different for sound and unsound banks, in line with *H1*.

Following the critical mass theory, and in line with previous findings of Farag and Mallin (2017) and Owen and Temesvary (2018), we assume that the relationship between female directors and bank risk is non-linear. Thus, we test *H2* by introducing an interaction between female directors and a critical mass dummy variable indicating three or more female directors on the board.

The results in Table 6 show that when there is no critical mass of women, the sign of the relationship between female directors and risk (first line: Mass = 0) is negative for sound banks and positive (however, less significant) for unsound banks. When the critical mass of women is reached (second line: Mass = 1) the magnitude of the relationships decreases. Therefore, when three or more female directors sit on the board of directors the impact on bank risk weakens with an increasing number of female directors. This aspect indicates we should introduce a quadratic term for the variable female directors to endogenously identify the threshold of female directors on the board after which the estimated relationship can even change sign. This will be tested in the next group of models.

Table 7 presents results of models featuring the quadratic term for the variable female directors (^2), instead of the critical mass dummy variable. Looking at the couple of estimated coefficients in the left boxes, we can state that findings show a significant non-linear, U-shaped relationship between female directors and bank risk when banks are sound (negative linear effect and positive quadratic effect). In this case, increasing the share of female directors beyond the threshold level may increase the bank risk (the quadratic effect predominates for high values of the variable). To better understand these results, the relationship between female directors and risk for sound banks is graphically represented in the left panels of Figure 1, where we plotted our estimated predictions

Table 4 Bank risk, linear models

	(1) *CE Ratio*	*(2)* *Leverage*	*(3)* *NPLs*	*(4)* *Price Volatility*
Female Directors (lag)	−0.0287 (0.0262)	0.00612 (0.00636)	0.00185 (0.0172)	−0.0294 (0.0305)
Board Size (lag, log)	0.00650 (0.0132)	−0.000717 (0.00466)	−0.00232 (0.00729)	−0.0180 (0.0121)
Independent Directors (lag)	−0.000665 (0.0126)	−0.00332 (0.00280)	−0.00616 (0.00638)	0.00162 (0.00794)
CEO Duality (lag)	−0.00175 (0.00539)	−0.00244 (0.00242)	−0.00222 (0.00301)	−0.00303 (0.00405)
Tenure (lag, log)	0.0197** (0.00841)	−0.00540* (0.00283)	−0.0103 (0.00990)	−0.0174** (0.00806)
Meetings (lag, log)	−0.000952 (0.00512)	−0.00533*** (0.00195)	0.00344 (0.00294)	0.00927* (0.00514)
Bank Size (lag, log)	0.0446*** (0.0126)	0.00783* (0.00417)	−0.00880 (0.00878)	−0.0482** (0.0210)
ROA (lag)	−0.0389 (0.163)	0.150 (0.115)	−0.990*** (0.326)	−0.874*** (0.221)
Loans Ratio (lag)	0.112*** (0.0395)	0.00587 (0.0152)	0.0196 (0.0179)	−0.0307 (0.0276)
Deposits Ratio (lag)	0.0232 (0.0358)	0.0173 (0.0146)	−0.0634*** (0.0177)	−0.0321 (0.0600)
Hard Quotas (lag)	0.0260* (0.0132)	−0.00529 (0.00455)	−0.00127 (0.00645)	0.0179* (0.00934)
Soft Quotas (lag)	0.0113** (0.00532)	0.00466*** (0.00145)	−0.0102*** (0.00316)	−0.00910* (0.00516)
GDP (lag, log)	−0.0248 (0.0337)	−0.0342*** (0.0102)	−0.0403*** (0.0152)	−0.0849** (0.0338)
Year effects, constant	Yes	Yes	Yes	Yes
Observations	990	968	995	983

Notes: Panel fixed effects (within) estimation (significant Hausman test); all the explanatory variables are lagged by 1 year (lag); natural logarithmic transformations of Board Size, Tenure, Meetings, Bank Size and GDP are used (log); Bank-level clustered robust standard errors in parentheses; significance levels: $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table 5 Bank risk, linear models, sound/unsound banks

	(1) *CE Ratio*		*(2)* *Leverage*		*(3)* *NPLs*		*(4)* *Price Volatility*	
Female Directors (lag) | m_Y = 0, 1	−0.0863*** (0.0253)	0.0587** (0.0284)	−0.0369** (0.0144)	0.0238*** (0.00804)	−0.0275* (0.0148)	0.0128 (0.0175)	−0.0816*** (0.0296)	0.00160 (0.0322)
Board Size (lag, log)	0.00849 (0.0122)		−0.000926 (0.00420)		−0.00279 (0.00728)		−0.0204* (0.0118)	
Independent Directors (lag)	−0.00156 (0.0125)		−0.00396 (0.00266)		−0.00490 (0.00636)		0.00319 (0.00822)	
CEO Duality (lag)	0.000372 (0.00491)		−0.00103 (0.00236)		−0.00248 (0.00288)		−0.00205 (0.00409)	
Tenure (lag, log)	0.0168** (0.00799)		−0.00620** (0.00269)		−0.0109 (0.00988)		−0.0172** (0.00785)	
Meetings (lag, log)	−0.00346 (0.00426)		−0.00491** (0.00192)		0.00365 (0.00284)		0.00913* (0.00504)	
Bank Size (lag, log)	0.0366*** (0.0104)		0.00703* (0.00387)		−0.00779 (0.00881)		−0.0473** (0.0210)	
ROA (lag)	−0.118 (0.148)		0.143 (0.100)		−0.936*** (0.336)		−0.861*** (0.212)	
Loans Ratio (lag)	0.106*** (0.0330)		−0.000855 (0.0139)		0.0139 (0.0183)		−0.0268 (0.0262)	
Deposits Ratio (lag)	0.00000776 (0.0326)		0.0210 (0.0135)		−0.0581*** (0.0177)		−0.0326 (0.0605)	
Hard Quotas (lag)	0.0284** (0.0125)		−0.00579 (0.00423)		−0.00191 (0.00638)		0.0139 (0.00943)	
Soft Quotas (lag)	0.0111** (0.00474)		0.00497*** (0.00147)		−0.0102*** (0.00313)		−0.00989** (0.00490)	
GDP (lag, log)	−0.0443 (0.0300)		−0.0252*** (0.00912)		−0.0385** (0.0149)		−0.0879** (0.0341)	
Year effects, constant	Yes		Yes		Yes		Yes	
Observations	990		968		995		983	

Notes: Panel fixed effects (within) estimation (significant Hausman test); all the explanatory variables are lagged by 1 year (lag); natural logarithmic transformations of Board Size, Tenure, Meetings, Bank Size and GDP are used (log); Bank-level clustered robust standard errors in parentheses; significance levels: $^{*}p < 0.10$; $^{**}p < 0.05$ $^{***}p < 0.01$; m_Y is a dummy variable that takes the value 1 when the risk (measured in terms of Y = CE Ratio, LEV, NPLs, PV) is above the sample median and 0 when the risk is below the sample median; | m_Y = 0, 1 means the coefficient on the left is conditional to m_Y being equal to 0 and the coefficient on the right is conditional to m_Y being equal to 1

Table 6 Bank risk, mass models, sound/unsound banks

	(1) *CE Ratio*		(2) *Leverage*		(3) *NPLs*		(4) *Price Volatility*	
Female Directors (lag) | m_Y = 0, 1; Mass (lag) = 0	−0.158*** (0.0447)	0.0746* (0.0409)	−0.0735*** (0.0246)	0.0308** (0.0120)	−0.0383* (0.0198)	0.0107 (0.0272)	−0.110*** (0.0395)	0.00447 (0.0469)
Female Directors (lag) | m_Y = 0, 1; Mass (lag) = 1	−0.0778*** (0.0241)	0.0476 (0.0298)	−0.0265** (0.0112)	0.0164** (0.00677)	−0.0259* (0.0149)	0.0119 (0.0171)	−0.0751** (0.0293)	0.00105 (0.0317)
Board Size (lag, log)	0.00653 (0.0119)		−0.00213 (0.00410)		−0.00355 (0.00770)		−0.0224* (0.0125)	
Independent Directors (lag)	−0.00255 (0.0121)		−0.00352 (0.00264)		−0.00511 (0.00639)		0.00289 (0.00819)	
CEO Duality (lag)	0.000736 (0.00481)		−0.00111 (0.00230)		−0.00249 (0.00291)		−0.00216 (0.00408)	
Tenure (lag, log)	0.0173** (0.00792)		−0.00609** (0.00263)		−0.0109 (0.00981)		−0.0168** (0.00789)	
Meetings (lag, log)	−0.00187 (0.00419)		−0.00411** (0.00186)		0.00393 (0.00289)		0.00944* (0.00499)	
Bank Size (lag, log)	0.0368*** (0.00989)		0.00696* (0.00358)		−0.00759 (0.00865)		−0.0463** (0.0208)	
ROA (lag)	−0.113 (0.143)		0.125 (0.0891)		−0.929*** (0.338)		−0.862*** (0.213)	
Loans Ratio (lag)	0.103*** (0.0317)		−0.00126 (0.0136)		0.0138 (0.0183)		−0.0244 (0.0259)	
Deposits Ratio (lag)	0.00284 (0.0325)		0.0223* (0.0131)		−0.0576*** (0.0179)		−0.0305 (0.0608)	
Hard Quotas (lag)	0.0283** (0.0124)		−0.00499 (0.00392)		−0.00174 (0.00638)		0.0152 (0.00940)	
Soft Quotas (lag)	0.0116** (0.00476)		0.00444*** (0.00143)		−0.0102*** (0.00312)		−0.00965** (0.00489)	
GDP (lag, log)	−0.0414 (0.0278)		−0.0237*** (0.00842)		−0.0386*** (0.0147)		−0.0869** (0.0338)	
Year effects, constant	Yes		Yes		Yes		Yes	
Observations	990		968		995		983	

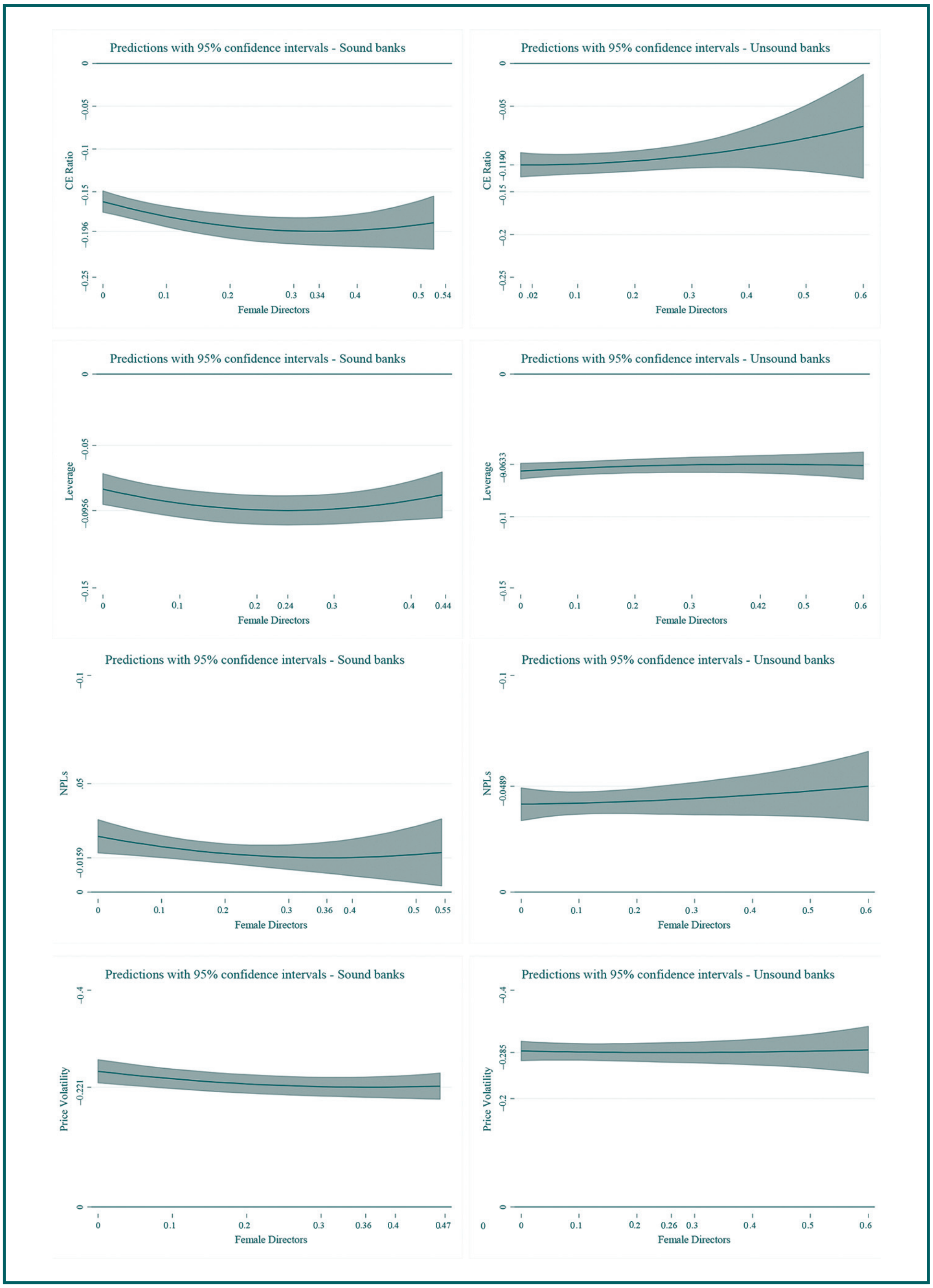
Notes: Panel fixed effects (within) estimation (significant Hausman test); all the explanatory variables are lagged by 1 year (lag); natural logarithmic transformations of Board Size, Tenure, Meetings, Bank Size and GDP are used (log); Bank-level clustered robust standard errors in parentheses; significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; m_Y is a dummy variable that takes the value 1 when the risk (measured in terms of Y = CE Ratio, LEV, NPLs, PV) is above the sample median and 0 when the risk is below the sample median; | m_Y = 0, 1 means the coefficient on the left is conditional to m_Y being equal to 0 and the coefficient on the right is conditional to m_Y being equal to 1; | Mass (lag) = 0 means the coefficients on the first line are conditional to Mass (lag) being equal to 0 and, alternatively, | Mass (lag) = 1 means the coefficients on the second line are conditional to Mass (lag) being equal to 1

Table 7 Bank risk, quadratic models, sound/unsound banks

	(1) CE Ratio	(2) Leverage	(3) NPLs	(4) Price Volatility
Female Directors (lag) | m_Y = 0, 1	−0.206*** (0.0569) −0.00332 (0.0536)	−0.126*** (0.0379) 0.0230 (0. 0146)	−0.0548** (0.0239) 0.00357 (0.0300)	−0.160*** (0.0504) −0.0209 (0.0577)
Female Directors^2 (lag) | m_Y = 0, 1	0.304** (0.130) 0.131 (0.146)	0.265*** (0.0993) −0.0275 (0.0257)	0.0761 (0.0462) 0.0173 (0.0460)	0.219** (0.102) 0.0408 (0.109)
Board Size (lag, log)	0.00965 (0.0125)	−0.000393 (0.00428)	−0.00254 (0.00728)	−0.0200* (0.0119)
Independent Directors (lag)	−0.00243 (0.0120)	−0.00305 (0.00263)	−0.00488 (0.00636)	0.00367 (0.00804)
CEO Duality (lag)	0.000600 (0.00484)	−0.000385 (0.00236)	−0.00247 (0.00288)	−0.00196 (0.00412)
Tenure (lag, log)	0.0173** (0.00773)	−0.00628** (0.00258)	−0.0108 (0.00985)	−0.0164** (0.00787)
Meetings (lag, log)	−0.00249 (0.00412)	−0.00448** (0.00189)	0.00383 (0.00284)	0.00971* (0.00499)
Bank Size (lag, log)	0.0370*** (0.0102)	0.00730** (0.00361)	−0.00763 (0.00883)	−0.0467** (0.0210)
ROA (lag)	−0.110 (0.143)	0.136 (0.0910)	−0.933*** (0.339)	−0.865*** (0.212)
Loans Ratio (lag)	0.102*** (0.0322)	−0.000589 (0.0134)	0.0135 (0.0183)	−0.0248 (0.0260)
Deposits Ratio (lag)	0.00312 (0.0322)	0.0233* (0.0127)	−0.0573*** (0.0178)	−0.0293 (0.0608)
Hard Quotas (lag)	0.0283** (0.0125)	−0.00433 (0.00398)	−0.00164 (0.00644)	0.0152 (0.00933)
Soft Quotas (lag)	0.0116** (0.00461)	0.00431*** (0.00143)	−0.00997*** (0.00317)	−0.00939* (0.00487)
GDP (lag, log)	−0.0422 (0.0291)	−0.0248*** (0.00856)	−0.0372** (0.0150)	−0.0828** (0.0342)
Year effects, constant	Yes	Yes	Yes	Yes
Observations	990	968	995	983

Notes: Panel fixed effects (within) estimation (significant Hausman test); all the explanatory variables are lagged by 1 year (lag); natural logarithmic transformations of Board Size, Tenure, Meetings, Bank Size and GDP are used (log); Bank-level clustered robust standard errors in parentheses; significance levels: $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$; m_Y is a dummy variable that takes the value 1 when the risk (measured in terms of Y = CE Ratio, LEV, NPLs, PV) is above the sample median and 0 when the risk is below the sample median; | m_Y = 0, 1 means the coefficient on the left is conditional to m_Y being equal to 0 and the coefficient on the right is conditional to m_Y being equal to 1

Figure 1 Predictions and confidence intervals of the risk measures in Table 7 as a function of percentage of female directors, differentiated for sound and unsound banks



(obtained as averages over the estimation sample) for the four measures of risk in Table 7 for different levels of the variable female directors. If we consider the common equity ratio as a risk variable, the optimum point, where the risk is the lowest, is when female directors represent 34% of the board of directors. After this threshold, an increasing share of female directors may worsen the risk profile of sound banks, whereas the optimum point for leverage is 24%, and for NPLs ratio and price volatility is 36% (Figure 1, left panels). By looking at the estimated confidence intervals, however, the effects on the right of the threshold are less significant and could also be interpreted as not significantly changing the risk, if not actually increasing it. The right-hand panels of Figure 1, for banks which are unsound, show that there is not a significant and reliable effect of female directors on bank risk, once the confidence intervals are considered.

These results support the idea that more women have a positive effect in less complex contexts, such as sound banks, rather than in more complex environments like unsound banks. This is somehow in line with the findings of Palvia *et al.* (2015) and Skała and Weill (2018), who identify a less complex environment with a reduced bank size – even though these studies concern female CEOs and chairwomen. Similarly, our results corroborate the evidence of Owen and Temesvary (2018) who argue that female directors work better in well-capitalized banks. Hence, it seems that our results support the arguments in favor of a women context-dependent impact, which could justify the variety of empirical evidence in the literature on the women-performance relationship – as assumed in Section 2.

As further evidence of Figure 1, however, the positive effect of more female directors ends at a certain threshold. For both sound and unsound banks increasing the share of female directors, once there is already a large proportion, is not going to improve a bank's performance. One possible explanation could be that up to a certain threshold, female directors are chosen according to their capabilities and experiences, allowing them to reduce a bank's risk. Beyond a certain threshold, the appointment of female directors may be driven by ethical or legal pressures. If that is the case, the appointed female directors may be younger, less skilled and less experienced, due to lack of eligible female directors who are qualified for the role (Ahern and Dittmar, 2012). This aspect may increase bank risk, as shown by Berger *et al.* (2014) for German banks. Besides, Owen and Temesvary (2018: p. 62) specifically note that their findings refer to a context of "voluntary expansion of boards gender diversity" and that their results "do not provide evidence about any potential regulatory approach that would mandate an increase in the share of women on boards." Our study, by contrast, also includes countries where gender quotas have been introduced by law, which increases the likelihood of appointing women without adequate skills and experience.

Another explanation could be linked to the findings by Schwartz-Ziv (2017), that support the best performance of gender-balanced boards – labelled by the author as boards with a "dual critical mass" – compared to nongender-balanced boards. Boards with a dual critical mass are found to be more informed and updated, more active and more involved in debates on a wide range of options and solutions. Ultimately, a gender-balanced board improves the decision-making process and makes problem-solving more effective, thus strengthening a firm's performance. Therefore, our study supports, among other things, that the application of a critical mass theory *stricto sensu* (Kanter, 1977a, 1977b) and moving beyond the "symbolic status" often held by female directors are not enough, on their own, to significantly improve bank performance.

4.1 Robustness check

To check the robustness of our findings, we run several different models. First, we rerun the models in Table 7 on many different area subsamples (Europe and North America, OECD, EMEA, developed countries and all their counterparts) to see if our results are confirmed in all areas. By estimations available upon request, our results continue to be largely confirmed in all the geographical areas considered.

Second, we re-estimated the results using different risk indicators (Common equity on total assets, Tier 1 ratio, Total capital ratio and Total capital on total assets): our results continue to be largely confirmed (estimations are available upon request).

Third, Table 8 presents a robustness check of the specification of Table 7 based on a different estimation methodology, which allows for the dynamic structure of our models. The commonly used static panel data techniques, in this case, would violate the strict exogeneity assumption. It is important to remember that – as already noted in the methodology subsection – the dynamic estimation methodology allows us to counter potential criticism regarding endogeneity of female directors and the bipartition on the dummy variable m_Y: these variables are considered predetermined and instrumented by their lags. The results, however, do not change significantly from those of Table 7. The relevant variables continue to show the same sign and significance (Table 8). Therefore, we can state that if an endogeneity problem afflicts our estimations in Table 7, the possible bias does not reverse our results.

5. Conclusions

Based on a sample of 215 listed banks from 40 countries over the period 2008–2016, we examine whether the relationship between female directors and risk is different in sound or unsound banks and whether a critical mass of female directors affects the risk.

First, we fill a gap in the literature by testing the relevance of sound and unsound banks and using several variables of risk. Our findings show that increasing female directors does not reduce bank risk when banks are unsound. Conversely, female directors have a significant and positive role when banks are sound.

Second, we contribute to the literature on critical mass theory by testing this theory for sound and unsound banks. Our findings show that the positive effect on risk is present until a certain threshold of female directors in sound banks. Possible reasons for this inversion of the positive effect might be found in the appointment of female directors with an inappropriate level of experience especially in presence of regulations/laws that bind the appointment of female directors (Ahern and Dittmar, 2012). Moreover, gender-balanced boards, namely, with a "dual critical mass", seem to assure more effective decision-making processes.

Thus, our results highlight that women may provide a better contribution to reducing bank risk in less complex environments, rather than in a complex context such as unsound banks. This is supported by literature on bank size (Palvia *et al.*, 2015; Skała and Weill, 2018), which shows that women contribute to performance improvements and decrease risk when the bank complexity is reduced.

Interestingly, our findings seem to support the idea that corporate gender laws and ethical pressures aimed at reducing gender discrimination can cause undesired effects, such as increasing bank risk, if the female directors are not chosen for their skills and ability. The selection process in the finance industry of both men and women should avoid stereotyping (Adams and Ragunathan, 2015). In this respect, Huse (2018) notes that the relevant issue is not how many women are appointed, but "who the women are". This aspect represents a limit to our analysis, because we did not consider, for instance, the level of expertise of the female directors or their education. Additional diversity traits could be examined in future research, such as age, educational and professional background and racial/ethnic minorities. Also the nature of the task performed plays a crucial role in the study of the impact of women on board, as demonstrated by Nielsen and Huse (2010); likewise, firm characteristics, such as the level of shareholder rights, can influence the relationship between gender diversity and firm value, according to Adams and Ferreira (2009). As a final note, as our results are strongly linked to the distinction of sound and unsound banks, it would be incredibly useful to further study this bank heterogeneity. It is our guess that such an analysis would benefit from the quantile analysis methodology, which could properly differentiate the results for different levels of risk.

Table 8 Bank risk, quadratic models, sound/unsound banks – robustness with dynamic panels

	(1) *CE Ratio*	(2) *Leverage*	(3) *NPLs*	(4) *Price Volatility*
Y (lag)	0.316*** (0.105)	0.459*** (0.0731)	0.863*** (0.0634)	0.830*** (0.0437)
Female Directors (lag) | m_Y = 0, 1	−0.273** (0.116) −0.0033 (0.0737)	−0.113*** (0.0320) 0.0338 (0.0317)	−0.0187 (0.0200) 0.0345 (0.0230)	−0.0634** (0.0321) 0.0407 (0.0324)
Female Directors (lag)^2 | m_Y = 0, 1	0.448** (0.222) −0.0350 (0.127)	0.192*** (0.0674) −0.0480 (0.0557)	0.0249 (0.0375) −0.0629 (0.0402)	0.124* (0.0653) −0.0499 (0.0753)
Board Size (lag, log)	0.0104 (0.0157)	0.00426 (0.00479)	−0.00928* (0.00494)	0.0197** (0.00806)
Independent Directors (lag)	−0.0136 (0.0108)	−0.000620 (0.00431)	−0.000830 (0.00533)	−0.00437 (0.00607)
CEO Duality (lag)	−0.00964** (0.00470)	−0.000398 (0.00191)	−0.00694*** (0.00210)	−0.00443* (0.00246)
Tenure_I (lag, log)	0.0129 (0.00887)	−0.00488* (0.00280)	−0.00785 (0.00502)	0.00948* (0.00511)
Meetings (lag, log)	−0.00230 (0.00420)	0.000238 (0.00172)	−0.00191 (0.00257)	−0.00571* (0.00345)
Bank Size (lag, log)	0.00739 (0.00484)	0.000643 (0.00142)	−0.000401 (0.00219)	−0.000883 (0.00210)
ROA (lag)	0.633* (0.357)	0.402*** (0.0996)	−0.408** (0.198)	−0.535*** (0.196)
Loans Ratio (lag)	0.0550* (0.0282)	−0.00362 (0.0139)	0.0444*** (0.0155)	0.0194 (0.0189)
Deposits Ratio (lag)	0.0339 (0.0250)	−0.00252 (0.0115)	−0.0574*** (0.0151)	−0.0319 (0.0214)
Hard Quotas (lag)	0.0178 (0.0123)	−0.00485 (0.00587)	−0.0134** (0.00619)	−0.00502 (0.00429)
Soft Quotas (lag)	−0.00178 (0.00562)	0.00296 (0.00209)	−0.00851** (0.00423)	−0.00108 (0.00241)
GDP (lag, log)	−0.00270 (0.0147)	0.00219 (0.00327)	0.00326 (0.00400)	0.0121** (0.00601)
Year effects, constant	Yes	Yes	Yes	Yes
Observations	975	953	987	971
Groups	209	202	212	209
Instruments	105	105	105	105
Regression $\chi 2$	389.27***	303.15***	1631.73***	2583.11***
AR(1)	−1.96**	−2.96***	−3.50***	−4.47***
AR(2)	1.42	1.05	−0.09	0.20
Hansen J-statistics	94.05	89.27	91.10	74.62

Notes: Two-step GMM system dynamic panel-data estimation (Blundell and Bond, 1998); all the explanatory variables are lagged by 1 year (lag); natural logarithmic transformations of Board Size, Tenure, Meetings, Bank Size and GDP are used (log); AR(1) and AR(2) are the Arellano-Bond 1st and 2nd order test on residuals; Hansen J-statistic is the test of over identifying restrictions; Windmeijer's (2005) finite-sample corrected-robust standard errors in parentheses; Female Directors and m_Y treated as predetermined (endogenous); only one lag of dependent and predetermined variables are used as instruments to diminish the problem of instrument proliferation; significance levels: $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$; Y (lag) is the lagged dependent variable inserted as regressor in the dynamic panel (with Y = CE Ratio, LEV, NPLs, PV); m_Y is a dummy variable that takes the value 1 when the risk (measured in terms of Y = CE Ratio, LEV, NPLs, PV) is above the sample median and 0 when the risk is below the sample median; | m_Y = 0, 1 means the coefficient on the left is conditional to m_Y being equal to 0 and the coefficient on the right is conditional to m_Y being equal to 1

Note

1. Australia, Austria, Bahrain, Belgium, Brazil, Canada, Denmark, Egypt, France, Germany, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kuwait, Malaysia, Netherlands, Nigeria, Norway, Oman, People's Republique of China, Philippines, Poland, Portugal, Qatar, Russia, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, and United States of America.

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Corresponding author

Helen Chiappini can be contacted at: helen.chiappini@unich.it