NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

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BOARD GENDER DIVERSITY AND BANK PERFORMANCE DURING COVID-19: DID WOMEN SAVE THE DAY?

BASIC RESEARCH PROGRAM
WORKING PAPERS

SERIES: FINANCIAL ECONOMICS
WP BRP 94/FE/2024

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BOARD GENDER DIVERSITY AND BANK PERFORMANCE DURING COVID-19: DID WOMEN SAVE THE DAY?[3]

This paper explores the impact of board gender diversity on bank performance during the COVID-19 crisis. Using data from 87 European banks from 2015 to 2021, we show that the presence of women on bank boards had a positive impact on bank profitability during the COVID-19 crisis. This effect is more pronounced in countries where the morbidity rate is higher. Our results suggest a negative relationship between the women on bank boards and bank credit risk during the pandemic. The impact of women on insolvency risk, however, appears only for banks with relatively large boards.

Keywords: board gender diversity, COVID-19, bank profitability, credit risk

JEL: G21, G34, O16

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[3] The paper was prepared within the framework of the Basic Research Program at the HSE University.

Introduction

The COVID-19 pandemic was expected to bring the deepest global economic recession since the Second World War (World Bank, 2020). COVID-19 was a poorly understood and rapidly spreading deadly disease, so governments implemented extraordinary measures to deal with the emergency. As a result of lockdowns enforced to mitigate the pandemic, most economic sectors faced a dramatic depression, and consumption and investment levels were generally reduced. Governments also implemented supportive fiscal and monetary measures to diminish the economic downturn. For instance, they provided additional liquidity to the banks and delayed some of the repayment obligations (World Bank, 2020).

Acting as intermediaries between governmental support and citizens, banks implemented measures by providing new loan opportunities and reorganizing existing ones. The role of banks in the financial system, which was enhanced during the COVID-19 crisis, cannot be overemphasized. Banks not only maintained the stability of the financial system but also provided support through donations (Kara et al., 2022).

To handle the liquidity problem which banks face in a crisis it is possible, for instance, to suspend loan commitments, invest in derivatives, change interest rates, or provide supplementary banking services (El-Chaarani, 2022). Such strategies generate additional cash flows and require innovative approaches from bank boards. Thus, effective corporate governance was essential for banks during the COVID-19 crisis.

The greater representation of women on corporate boards is proven to significantly enhance efficiency (Valls Martinez et al., 2019; Beji et al., 2021; Galletta et al., 2022). Female directors establish a comprehensive governance approach, enhancing creativity and innovation in decision-making (Huse and Solberg, 2006; Huse et al., 2009). A diverse board is also associated with superior bank performance and lower bank riskiness (Gulamhussen and Santa, 2015; Owen & Temesvary, 2018).

In this paper, we examine the impact of women board members on bank profitability and riskiness during the COVID-19 pandemic. We use an original set of data collected from BoardEx, BankFocus, and World Bank Open Data databases. We exploit financial and board composition data of the banks located in Europe and the UK from 2015 to 2021. We employ both static and dynamic techniques of panel data estimation and run corresponding tests. A special variable that captures the impact of women to performance and riskiness specifically during coronavirus is constructed.

We contribute to the literature on corporate governance topics. Particularly to the stream which examines performance and riskiness inferences of gender-diverse boards. Our results support

evidence of a positive and significant impact of women board members on various performance indicators. The impact of women directors on credit risk is negative, while we cannot confirm any significant influence on insolvency risk. We also contribute to the literature on the economic consequences of the COVID-19 pandemic.

Based on our unique data sample, we conclude that the share of women on boards had a positive and significant impact on bank profitability during the COVID-19 crisis. We show that this impact correlates with the intensity of the spread of COVID-19: the more prevalent the disease, the higher the impact of women board members.

The negative impact of women board members on credit risk is also strengthened with respect to the spread of COVID-19 in different countries. These findings have substantial research implications. While prior studies provide mixed evidence on the impact of women, our results confirm that it is significant precisely in emergencies and is almost irrelevant under favorable economic conditions. This conclusion is significant for the discussion on the ambiguity of results obtained elsewhere in the literature.

The policy implications of our results suggest that improved gender diversity might protect banks in crises, and the positive contribution improves depending on the strength of the crisis. Our findings suggest improving board diversity—without waiting for another crisis—will have a positive impact on bank performance and negative impact on bank riskiness.

Literature Review and Hypotheses Development

The Impact of Women Board Members on Bank Performance and Riskiness

The financial sector is a special industry and banks are special organizations as they play a vital role in financial system stability (Fama, 1985). The banking industry also has an influence on the non-financial sector as well. Efficient governance of banks is important not only for financial industry operations but also for the economy as a system. Another special feature of the financial industry compared with non-financial ones is that women are still highly underrepresented on financial companies' boards. Hence, in the literature, it is customary to study financial and non-financial firms separately. Nowadays the amount of research focused mainly on the banking industry is increasing. Researchers specify various hypotheses about the impact of gender diversity on the banking sphere as effective bank governance is extremely beneficial and difficult to achieve.

The question of banking governance became increasingly debated after the subprime mortgage crisis in 2007–2009. Adams and Mehran (2012) raise a question about the impact of board

governance structure on performance. They show board independence and board size as important factors affecting bank performance. However, many researchers such as García-Meca et al. (2015) identify gender diversity as a major factor in improving bank performance. The research is based on data from 156 banks located in 9 European countries collected in the period 2004–2010. The authors use GMM proposed by Arellano and Bond (1991) in order to deal with endogeneity issues. Gulamhussen and Santa (2015) confirm this result. They construct models on a sample of 461 OECD banks. The extended size of the sample makes the conclusions more reliable. The main takeaway of this study is that the more women participate in boardroom discussions, the better the bank performs.

To address the endogeneity problem, Ting (2021) uses a logic-modeling approach to investigating the Chinese banking sector. The conclusion complements the previous studies. The author also points out that women in senior management positions tend to have even stronger authority than men. This might be explained by the "glass ceiling" effect—that women directors tend to be more educated, experienced, and skilled than men in similar positions as women must overcome discrimination to obtain higher positions (Adams et al., 2012). Bouteska and Mili (2021) study the Asian market on the same subject. They prove the positive impact of women on bank performance in ASEAN countries (Brunei, Cambodia, Myanmar, Laos, Indonesia, Malaysia, the Philippines, Thailand, Singapore, and Vietnam). The significance of Bouteska and Mili's contribution is that the impact of gender exists even in countries where there is less discussion about equality issues.

Del Prete and Stefani (2021) obtain the results which are also in line with previous studies by looking at Italian bank governance. They include observations for 15 years and adopt a two-step OLS approach with instrumental variables to avoid endogeneity issues. Exploiting a data set based on a single country (Luxembourg), Reinert et al. (2016) include an extended time period (1999–2013) to make the estimations look solid. They also confirm the positive link between women on bank boards and bank performance. They also confirm that the impact of women was almost twice as strong during the financial crisis of 2007–2009. This finding is explained by women's high aversion to risk, amongst other factors.

There is also a significant stream in the literature that examines the impact of women on bank risk management. It is commonly believed that women in general are more risk-averse and having them on bank boards reduces the average level of risk through their faster responses to challenges and more adaptive behavior.

Gulamhussen and Santa (2015) confirm the negative relation between the presence of women directors on the board and banks' attitude to risk. They examine the largest 25 banks located in

24 OCED countries. The estimation is completed for supervisory boards and audit committees. The results are valid both for credit risk and insolvency risk. The authors relate their results to the stricter monitoring, conservatism, and general risk aversion associated with women directors. The results are consistent for the different risk measures and modeling approaches employed.

Jabari and Muhamad (2022) conclude that women directors also improve insolvency risk measures for Islamic banks. The sample consists of all Islamic banks functioning all over the world from 2010 to 2018. The risk measures are non-performing loans and z-score. The results align with the assumption of greater risk averseness of women directors as they prove positive and significant effects of the share of women directors on mitigating insolvency risk.

Ararat et al. (2023) examine how the gender diversity of the workforce influences bank risk. They focus not only on the representation of women on the board and other decision-making bodies but also on the representation of women in the other bank structures. They collect financial data from 462 banks operating in 17 countries over 2005–2012. However, the sample is significantly reduced due to data availability issues which is quite typical for gender research in banking. The authors find positive effects of gender diversity on bank risk measures as well as on bank effectiveness.

Lu and Boateng (2023) focus on the credit risk of the banks located in the UK. They detect a negative impact of women directors on credit risk measures. They also confirm the robustness of the results by using alternative modeling specifications that account specifically for the financial crisis period. Díez-Esteban et al. (2022) prove that women on board influence banks' systemic risk, which is the risk imposed by a bank on the whole financial system in crisis. Elnahass et al. (2023) confirm that board diversity is strongly associated with bank stability.

However, in this sphere, the search findings are also inconclusive. Birindelli et al. (2020) conclude that women do not diminish bank risk if the bank itself is not trustworthy. However, for credible banks, the impact of women is significant. The authors investigate 215 banks listed in 40 countries for 8 years. They use a panel data approach, different specifications of the model, and 4 indexes of risk to obtain robust results.

There are more studies in which no significant impact of women on bank risk is found. For instance, Shukla et al. (2021) review Indian banks. Although they support the evidence of the positive role of women in terms of performance, the authors do not confirm the existence of any significant influence on risk measures. Abou-El-Soo (2021) even proves the negative dependence between the share of women on board and attitude to risk on the assumption of high capitalization. Under such circumstances, women are rewarded if they invest in riskier assets. Therefore, the author claims that generally women tend to invest in less risky assets mostly in

periods of high uncertainty. Exploiting the mixture of agency theory and social psychology studies, the researcher argues that women's decisions are likely to be determined by capital structure rather than by inherent risk aversion. Abou-El-Soo studies 195 US banks over a 16-year period and the reduction of risk in more diverse boards remains, the author explores the conditions when this is not supported.

No significant dependence between gender structure of the board and risk is detected based on UK financial companies (Akbar et al., 2017). The paper explores different board characteristics such as board size, board independence, gender diversity, and CEO profile. There are data on all firms operating in the financial sector of the UK, including banks, insurance, real estate companies, and firms providing financial services over 11 years. GMM modeling is used, and the results are proven to be reliable. However, other authors reveal the positive effects of women on risk management practices. Kacem and Harbi (2022), studying the 50 largest banks worldwide, conclude that there is not only a positive correlation between the score of women directors and performance, but also risk management significantly improves with gender diversity. The authors claim that the GMM method is the most appropriate in their research.

Another popular gender research direction is the estimation of the impact of women on banks' environmental performance. As banks are increasingly involved in the sustainability debate, they are expected to implement sustainable management practices. Gender diversity in leadership is a must for a sustainable world (Sustainability Development Goals). Researchers support this statement empirically. Birindelli et al. (2019) study 96 banks in Europe, the Middle East, and Africa from 2011 to 2016. They use panel data and, according to tests, choose a random effect model rather than a fixed effect model to define the dependence between environmental performance and the share of women board members. They determine a positive and significant nonlinear relationship which is also in line with critical mass theory and homophily. These results are supported by Galletta et al. (2022) who explore banks in 48 countries over 8 years, constructing OLS and probit models to verify women’s contribution to environmental, social, and governance (ESG) dimensions, showing positive effects.

However, the conclusions in this field as well as on the other topics related to the impact of gender diversity are not straightforward. Gallego-Sosa et al. (2020) find no significant relationship between the share of women directors and banks’ environmental performance. They use data from the 52 largest banks located in Europe and North America and exploit a fixed effect model.

The question of the impact of women directors on bank metrics has been a topical issue among the scientific community over the past few decades. Researchers have investigated this impact by

applying various techniques and indicators. However, the results are equivocal, so the discussion is expanding to consider more specifics in relation to different circumstances, for example, business cycles and crisis periods.

The Impact of Women Directors During Crises

Effective governance is particularly relevant in crisis situations. For instance, Mitton (2002) highlights the significant role of corporate governance on firms' outcomes during the East Asian financial crisis of 1997–1998. Lemmon and Lens (2003) substantiate the same results stressing the importance of ownership structure. Francis et al. (2012) prove that firm performance depends on the corporate governance effectiveness over the 2007–2009 crisis.

Gender diversity is an essential part of effective corporate governance. Reinert et al. (2016) show that the impact of women directors on bank performance increased during the 2007–2009 financial crisis almost doubled compared with previous and later time periods. This finding is in line with the studies underlining the monitoring function and innovative approaches of women directors as these instruments are likely to be more substantial in overcoming emergencies.

The COVID-19 pandemic triggered the latest global financial crisis. The banking system encountered incredible pressure, attempting to support the clients and counteragents facing pandemic and quarantine restrictions. Consequently, effective corporate governance during the pandemic was vitally important. There are not yet many related articles, but the field will develop further from various perspectives.

The most relevant paper about the impact of gender diversity during the pandemic is Kara et al. (2022). The authors hypothesize that responses of women directors to the shock in the banking industry are likely to be more effective. They build a unique measure to estimate bank reactions based on textual analysis of news, press releases, and reports which provide data on the actions implemented by banks to mitigate negative effects of the pandemic. The authors develop a scoring system that gives points for the support of customers and the economy by implementing mechanisms proposed by the government and for introducing in-house activities for the same purpose. Points are added for charitable contributions and donations, the support of financial stability, the protection of employees, and providing information. The total score reflects banks' responses to the pandemic.

The total score is the dependent variable of the model, while the variable of interest is the proportion of women on the board. Board and bank controls are also introduced in the model. The main employed model is OLS with country fixed effects adjusted for possible

heteroscedasticity. Kara et al. provide empirical evidence of the positive relationship between board gender diversity and banks' responses during COVID-19. They prove that the more women there are on the board, the more banks support their clients and employees during the crisis. Higher levels of charitable contributions and donations are also associated with women directors.

According to Garikipati and Kambhampati (2021), women national leaders did better during the first wave of the pandemic. They reacted more quickly and decisively and implemented a proactive and effective policy against COVID-19. Studying the relationship between the responses of 194 countries to the COVID-19 pandemic and their social and demographic characteristics, the authors make a substantial conclusion about the role of women leaders in handling the crisis. Women leaders are proven to obtain significantly better outcomes systemically, even accounting for a wide range of specific country characteristics.

Naeem et al. (2022) investigate the relationship between women and sustainable performance during the COVID-19 crisis in Malaysia. They show a positive relationship in the financial sector, while there was no evidence for non-financial firms. This once again suggests that the financial industry is a special sector in terms of corporate governance.

Turning to financial outcomes during the COVID-19 crisis, Akhtar et al. (2022) find out that firms with gender-diverse boards experienced higher abnormal returns. According to the authors, as women directors improve board monitoring and advisory functions and their impact is highly appreciated by investors, especially in a crisis. Hence, the stock price response to the COVID-19 pandemic is improved by women directors through two channels: investor expectations and superior board functioning.

These conclusions confirm the significance of higher diversity during crisis periods. The impact of women is reinforced in emergencies as a high degree of uncertainty involves wider discussion and requires the establishment of extraordinary measures.

Hypotheses

We base the main hypothesis of our study both on theoretical and empirical conclusions outlined above. Even though there is ambiguity in the outcomes of different studies examining the impact of women on boards on firm targets, the authors focused on crises which support the existence of the positive impact of women. Thus, we argue that women on boards improve bank profitability and reduce riskiness substantially during the COVID-19 crisis compared to the other banks. We focus on the banking industry and explore only the banks located in Europe and the UK so that the obtained results are more robust. Following Kara et al. (2022) we argue that banks with greater board gender diversity are better able to cope with unexpected challenges like COVID-

19. In line with Reinert et al. (2016) we intend to verify whether better representation of women improves performance during crises. Consequently, the main hypothesis is:

Hypothesis 1: A higher share of women on boards is associated with higher bank profitability during the COVID-19 crisis.

Speculating further upon this issue, we wonder whether the impact of women is also positively correlated with the severity of the pandemic. To the best of our knowledge, there are no articles investigating this question. However, several authors check the mutual effects of women being represented and other board or firm characteristics on performance. For instance, Naeem et al. (2022) examine the mutual impact of gender diversity and firm age on performance among other things. Lee (2023) considers the joint effects of gender diversity, disclosure requirements and the shared impact of gender diversity and shareholders' rights protection on Tobin's Q measure of performance. Accordingly, the research on the mutual impact of women on bank boards and the spread of COVID-19 among different countries illuminates the dimension of the impact of women. Hence, the following hypothesis is tested:

Hypothesis 2: The positive impact of women on bank profitability during the COVID-19 crisis is more pronounced in the countries where the incidence of COVID-19 is higher.

Following Lu and Boateng (2023), and Ararat et al. (2023), we examine how gender diversity of bank boards impacts the attitude to risk. As women in general are considered to be more risk averse than men, we suppose that they have the power to reduce the risk of bank portfolios. However, we consider the impact of women on riskiness specifically during COVID-19. We argue that the effects of board gender diversity would be more substantial during the crisis for credit risk and insolvency risk indicators. Consequently, the next hypothesis is:

Hypothesis 3: Higher share of women on bank boards is associated with lower bank riskiness during the COVID-19 crisis.

Considering the reasoning supporting the second hypothesis and the assumption of the impact of women on riskiness, we examine whether women's contribution to risk reduction strengthens as

COVID-19 severity increases from one country to another. This aspect has not yet been discussed in the literature according to our knowledge. Thus, the following hypothesis is tested:

Hypothesis 4: The impact of women on bank riskiness during the COVID-19 crisis is more pronounced in the countries where the incidence is higher.

Methodology and Data

Sample and Data Sources

The data was collected from BoardEx, Bureau van Dijk BankFocus, and World Bank's databases. The BoardEx database provides a wide range of information about the characteristics of directors working for the companies in various industries and countries. The sample covers board information related to banks located in Europe and the UK between 2015 and 2021 with annual frequency. The time period is chosen such that the largest number of observations could be included in the sample, with regard to the issue of data availability. Thus, 156 banks are left in the sample after deleting those having missed observations over the period.

Financial data is collected from the BankFocus database. These two data sets are merged using ISIN identification numbers and bank names. After the merger procedure, the number of banks that have all necessary observations decreased to 87. Country-specific variables are then added from the World Bank's database. The final sample contains 2,380 bank-year observations on board composition, just over 5,000 bank-year observations on financial indicators, and over 900 observations on country-specific variables of 87 banks located in 22 countries over 7 years.

Measuring Risks and Profitability

Following Post and Byron (2015), we focus on accounting measures of bank profitability such as Return on Assets (ROA), Return on Equity (ROE), Return on Average Assets (ROAA), Return on Average Equity (ROAE). They are unified across different countries and applicable to all banks in the same manner. They are more reliable, stable, and consistent compared to market-based performance indicators if the goal is to obtain meaningful insights on annual data for banks located in different countries.

ROA is defined as the ratio of net income and total assets and denotes a bank's profitability. ROE is calculated as the ratio of net income and shareholders' equity and shows returns on net assets. This measure is initially calculated in the BankFocus database using the profit and loss statement before tax. ROAA is calculated as a ratio of net income before tax and interest, and an average book value of total assets. ROAE is computed as net income after tax divided by the

average book value of total equity. We use these three measures to check the robustness of our results and confirm that the findings are not dependent on the chosen method of performance measure calculation.

By choosing accounting measures of bank performance, we follow the approach used by numerous authors studying gender diversity field. For example, ROA and ROE are used as dependent variables by Adams and Ferreira (2009), Pathan and Faff (2013), Gulamhussen (2015), Owen and Temesvary (2018), Ting (2021), Galetta et al. (2022), and many others.

All the profitability variables show similar dynamics over the period under consideration (see Figure 1). They all decreased in 2020 and began to recover in 2021 although they did not reach the level obtained before COVID-19. ROAA varies between 37.31% and 65.64%. ROA varies between 35.43% and 61.02%. The ranges of ROE and ROAE are much smaller. ROE demonstrates values in an interval between 5.8% and 10.89% with a mean of 8.53%. The difference between the minimal and maximum value of ROAE over the period is just about 4%.

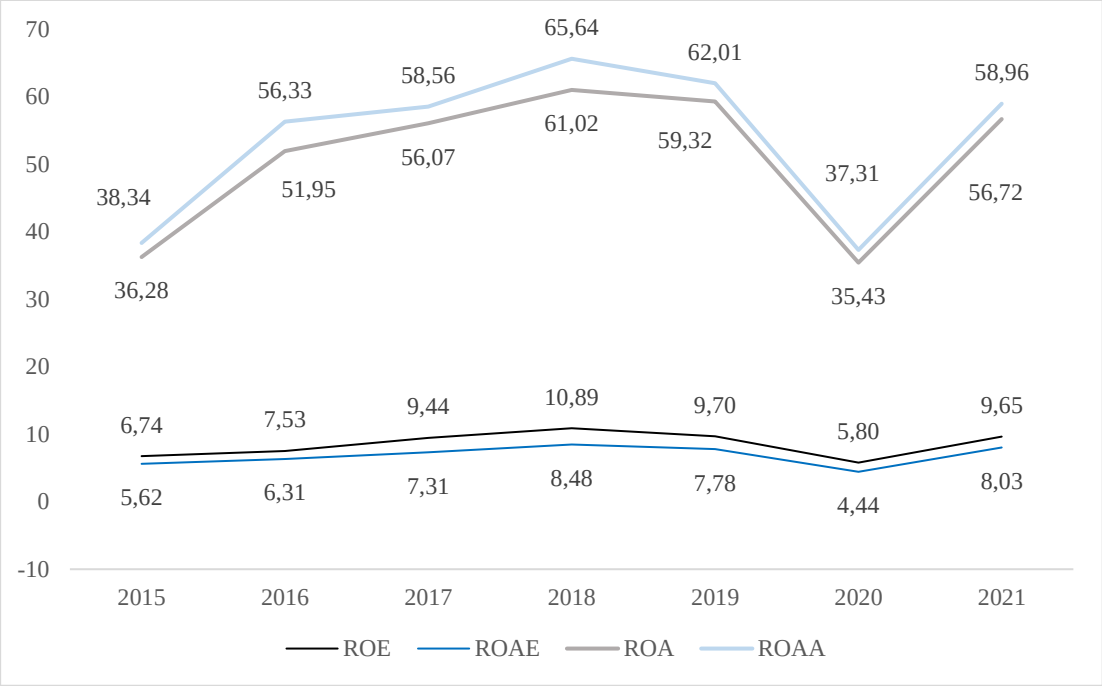

Figure 1 Average Performance Evolution over Time, %

Bank risk can be measured by a range of metrics as well. Following Gulamhussen and Santa (2015), Jabari and Muhamad (2022), Lu and Boateng (2023), and Ararat et al. (2023), The Loan Loss Ratio (LLR) and the Non-performing Loans ratio (NPL) are employed as measures of bank credit risk, while Z-score (SCORE) is used a proxy for insolvency risk. LLR is calculated as the loan loss reserve value divided by gross loan value. This ratio shows the size of reserves a bank has to hold to manage its risk. A higher value of LLR signifies a higher credit risk for a bank.

Figure 2 shows that the average value of LLR varies from 4.01 to 1.76 over the period under consideration.

NPL ratio is defined as the total value of non-performing loans divided by the total value of gross loans. This measure indicates how much of the banks' loans are not repaid or are in default. The higher value of NPL implies that the credit risk of a bank is higher. It varies between 1% and 90%, meaning that there is a wide range of banks in the sample whose attitude to risk differs a lot. Some banks in a particular year have almost zero defaulted or unpaid loans, while others are on the verge of total default. The average value of NPL ration over time is consistent enough. This measure of credit risk is reducing over time on average identifying and improving the risk perception among banks.

Bank insolvency risk is proxied by the Z-score. It indicates the likelihood of a bank being able to deal with its financial liabilities. It captures the relationship between a bank's performance, capital, and volatility:

$$SCORE = \frac{ROA + TE/TA}{SD(ROA)} \quad (1)$$

Where *ROA* is return on assets, *TE* is total equity, *TA* is total assets, and SD(ROA) is the standard deviation of ROA calculated as a moving average over 1 year.

The higher the value of this indicator, the lower the probability of the bank being insolvent. The average value of insolvency risk over all the banks in the sample varies much more over time than credit risk measures according to Figure 2. The risk of bank insolvency increased before the start of the pandemic in 2019. However, a significant improvement was identified in 2021. This could be related to the governmental support measures implemented during the pandemic.

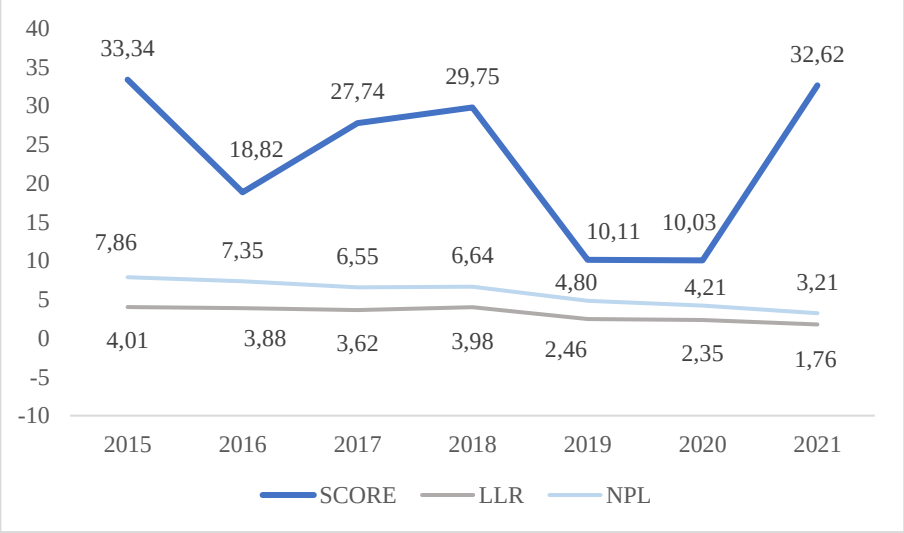

Figure 2 Average Risk Evolution over Time, %

Measuring Bank Board Gender Diversity and the COVID-19 Shock

Following Cucari (2018), and Birindelli (2019), we proxy bank board gender diversity by the share of women on board. The ratio of women (*RFEM*) is calculated as:

$$RFEM = \frac{FEM}{BOARD} \qquad (2)$$

Where *FEM* is the number of women on board and *BOARD* is total number of directors.

The average value of RFEM in our sample is about 27.5%. The median board size is 12, while the median number of women on board is 3. Thus, every 4th director of a representative bank is a woman. We consider median values as the means are not integers and we cannot accurately interpret the fractional number of people. Over 7 years the average board size increased between from 23.5% to 32%.

Checking the robustness of the results we substitute *RFEM* with the Blau index (Blau, 1977; Bear et al., 2010; Owen and Temesvary, 2018; Alharbi et al., 2022). Blau index (*BLAU*) is a proxy of board diversity, and it is calculated as:

$$BLAU = \left[1 - \sum_{g=1}^{G} P_g^2\right] \qquad (3)$$

Where P is the number of females and males on the board divided by the total number of directors and g is the gender index.

BLAU lies in the range from 0 to 0.5. The maximum possible value implies there are 50% of females and 50% of males on board. Low values mean a poor level of diversity. *BLAU* increases over time and is highly correlated with the female share ratio. *BLAU* increases from 32.7% to 40.3% over 7 years.

Figure 3 illustrates the distributions of average and median female share on board and the Blau index from 2015 to 2021.

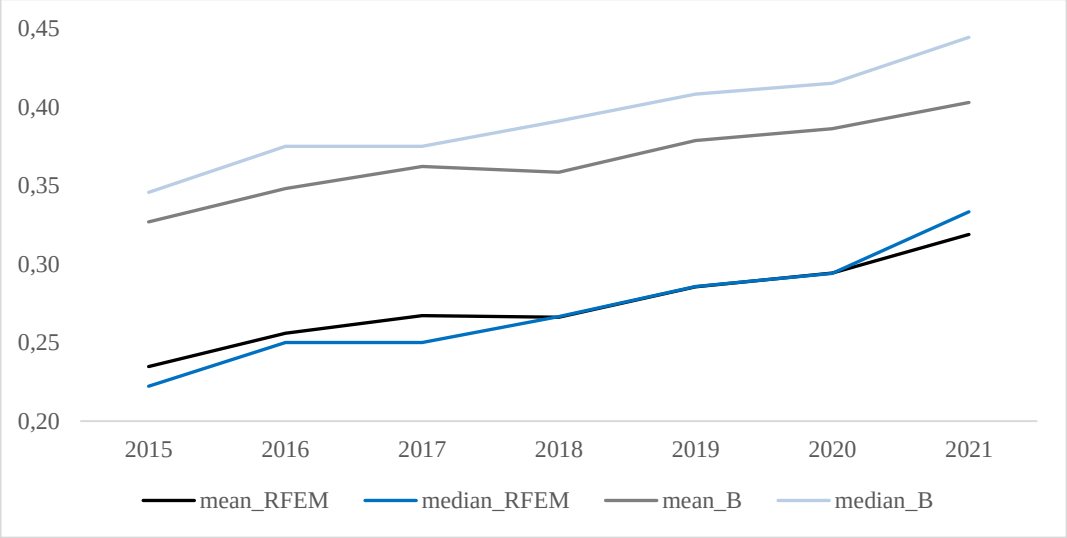

Figure 3 Average and median of female ratio and Blau index over 2015-2021

Table 1 shows the summary statistics and their dynamics of the gender diversity variables.

Table 1 Summary Statistics of Female over Time

Variable	Statistic	2015	2016	2017	2018	2019	2020	2021
RFEM (%)	mean	23.47	25.60	26.71	26.62	28.55	29.44	31.89
	median	22.22	25.00	25.00	26.67	28.57	29.41	33.33
	standard deviation	12.80	12.89	12.17	12.76	12.15	12.14	12.61
	min	0	0	0	0	0	0	0
	max	50.00	53.85	53.33	57.14	50.00	54.55	55.56
BLAU (%)	mean	32.69	34.81	36.22	35.85	37.88	38.63	40.30
	median	34.57	37.50	37.50	39.11	40.82	41.52	44.44
	standard deviation	13.48	12.84	11.47	12.64	11.85	11.12	9.97
	min	0	0	0	0	0	0	0
	max	50	50	50	50	50	50	50

There are also two different COVID-19 measures exploited. The first one is a dummy variable which equals 1 in 2020 and 2021 and 0 otherwise (*DCOVID*). It captures the simple presence of the pandemic. The second is the ratio of people who contracted COVID-19 to the population of a country (*COVID*). This measure not only detects the simple presence of the pandemic but also reveals the variability of pandemic's impact among the banks located in different countries.

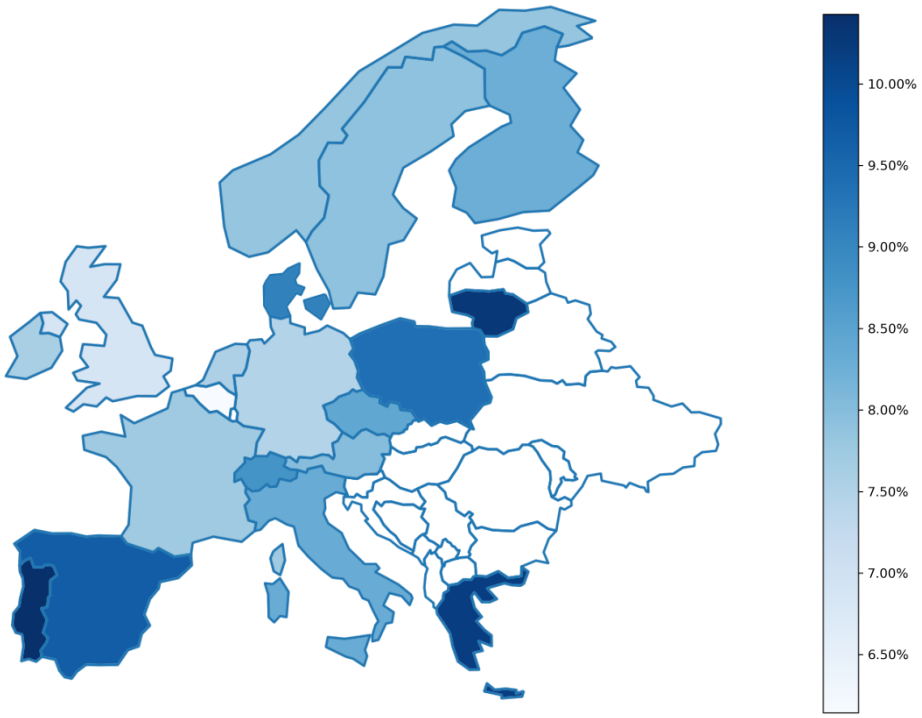

Figure 4. Average COVID-19 spread intensity per capita in European countries in 2020-2021, % of population (darker colors indicate higher intensity of COVID-19)

Controls

The set of control variables can be divided into three categories. We use board controls collected from BoardEx, banks' financial characteristics taken from BankFocus, and country-specific variables collected from the World Bank's database.

The most frequently used board control is board size. We include board size (*RBOARD*) as the proportion of the total number of directors at the end of the fiscal year to total assets. Following Terjesen et al. (2016), Birindelli (2019), and Elnahass et al. (2020, 2022), we expect a larger board size to have a negative impact on bank performance because of possible degradation of effective communication despite the greater information and resources available for larger boards. In line with that, we also expect board size to increase bank riskiness.

As another board control, the average age of board members (*AGE*) is included. The average age is expected to negatively affect bank performance in compliance with results obtained by Ting (2021), Elnahass et al. (2022), and Kara et al. (2022). Older directors are assumed to increase bank riskiness as well.

The average tenure on board (*TENURE*) reflects the average number of years the directors have been on the board at the end of the financial year. We expect positive dependence between

average tenure on the board and bank performance since more experienced directors are likely to do their job more effectively. This expectation is in line with Fernandes and Fich (2009), Owen and Temesvary (2018), and Kara et al. (2022). This measure is also expected to improve bank attitude to risk.

Banks' financial characteristics impact bank performance without doubt. Following the literature, we employ control variables to account for bank size, leverage, risk, and efficiency.

As a measure of bank size, we employ a logarithm of total assets (*LTA*) following Elnahass et al. (2020, 2022), Alharbi et al. (2022), and Kacem (2022). Larger banks are associated with worse performance as it is more complicated to effectively organize the functioning of a large organization. However, larger banks are expected to allocate necessary resources more quickly to deal with crisis situations (Kara et al., 2022).

To accommodate bank leverage, we use Tier 1 capital ratio (*TIER*) which is calculated as core Tier 1 capital divided by risk-weighted assets. Tier 1 capital is defined as a measure of a bank's financial strength. In line with Terjesen et al. (2016), Birindelli (2019), Elnahass et al. (2020), and Alharbi et al. (2022), banks with higher leverage are expected to perform poorly as they have fewer opportunities to allocate funds for development and innovation.

As a measure of efficiency, the ratio of total operating expenses to total operating income (*CINC*) is used. This measure demonstrates the proficiency of management in keeping the bank cost-effective and revenue-generating at the same time. Intrinsically successful cost management is expected to improve bank performance. Thus, we expect a negative dependence between the efficiency ratio and performance. The expectation is supported by Galletta et al. (2022), and Kacem (2022).

To study the impact on risk measures, loans and capital indicators are most commonly used (Gulamhussen and Santa, 2015; Andrieș et al., 2017). *LOANS* is the share of loans in total assets. A positive impact is expected on *LLR* and *NPL* as a greater amount of loans is likely to increase credit risk. A negative impact is expected on *SCORE* as the insolvency risk also grows with an increase of banks' liabilities. *CAPITAL* is the share of capital funds in total assets. *CAPITAL* is supposed to have a negative coefficient related to the regressions with *NPL* and *LLR* as dependent variables because higher capital reduces credit risk. We expect a positive coefficient for the regressions with *SCORE* as the dependent variable as a higher score means lower insolvency risk.

Finally, we also control for country specifics by exploiting the logarithm of gross domestic product per capita (*LGDP*). Countries with higher GDP are likely to have more developed banking systems and, consequently, these banks probably perform better (Alharbi et al., 2022;

Elnahass et al., 2022). On the other hand, people in richer countries consume more and perhaps there are more loans and fewer resources for the development of the banking system, so the GDP contribution might be negative as well (Terjesen et al., 2016; Elnahass et al., 2020). Table A1 in Appendix gives a brief description of all introduced variables, complemented with data sources and units of measurement. Table 2 gives the descriptive statistics for all the variables.

Table 2. Descriptive Statistics

Variable	Mean	St. Dev.	Min	Median	Max
ROA	0.48	0.76	-3.78	0.48	3.33
ROE	0.08	0.11	-0.76	0.08	0.46
ROAA	0.52	0.75	-3.98	0.49	3.32
ROAE	0.07	0.09	-0.55	0.07	0.46
LLR	0.03	0.06	0.001	0.02	0.93
NPL	0.06	0.10	0.001	0.03	0.90
SCORE	0.23	0.63	0.06	0.09	10.57
DCOVID	0.29	0.45	0.00	0.00	1.00
COVID	2.39	4.84	0.00	0.00	23.96
RFEM	27.47	12.70	0.00	26.67	57.14
BLAU	36.62	12.13	0.00	39.11	50.00
RBOARD	1.30	7.21	0.01	0.19	96.51
AGE	56.95	3.37	43.82	56.87	65.50
TENURE	5.07	2.42	0.10	4.81	14.64
LTA	18.04	1.99	11.91	17.89	21.84
TIER	16.19	3.86	5.50	15.80	41.60
CINC	64.90	21.45	20.03	61.76	300.29
LGDP	10.71	0.61	9.05	10.74	12.10
CAPITAL	7.21	2.59	1.91	6.77	15.99
LOANS	11.73	5.01	0.01	10.78	32.00

Model Specification

To investigate the impact of women board members on bank profitability and riskiness measures during the COVID-19 pandemic and to test the first and the third hypotheses we start with dividing the initial data set into two subsamples. The first one includes all the periods before the coronavirus pandemic (2015–2019). The second one includes all the observations over the period of the COVID-19 outbreak (2020–2021). For each subsample we estimate the following equation by applying panel OLS model with bank fixed effects:

$$Dep_{it} = \gamma RFEM_{it} + \beta CONTROLS_{i,t-1} + \alpha_i + \varepsilon_{it} \quad (4)$$

where *Dep* is a vector of variables measuring bank profitability (*ROA, ROAA, ROE, ROAE*) or riskiness (*NPL, LLR, SCORE*). *RFEM* stands for the ratio of women directors to the board size. We focus on the coefficient of the *RFEM* variable and check whether it differs in the two periods

and whether it has a significant impact on the dependent variable. *CONTROLS* stands for the vector of control variables detailed above: board controls are *RBOARD, RFEM, AGE, TENURE*; bank controls for regressions with performance as dependent variable are *RTA, TIER, RWA, CINC;* bank controls for regressions with riskiness measure as dependent variable *CAPITAL, LOANS*; and country control is *LGDP*. The bank index is *i*, *t* is an index for a year. All of the control variables are used with one year lag as their influence is expected to be delayed.

At the second step, we estimate the following regression for the full sample:

$$Dep_{it} = \phi Dep_{i,t-1} + \gamma(DCOVID * RFEM_{it}) + \beta CONTROLS_{i,t-1} + \delta DCOVID_t + \alpha_i + \varepsilon_{it} \quad (5)$$

where *DCOVID* is a dummy variable which equals 1 in 2020 and 2021, and 0 otherwise.

We expect a negative impact of *DCOVID* and a positive impact of *DCOVID*RFEM* on profitability measures and the Z-score. We expect a positive impact of *DCOVID* and a negative impact of DCOVID*RFEM on credit risk variables as higher values of both *NPL* and *LLR* indicate higher risk.

As performance tends to persist over time and the period under consideration is quite long, following Pathan and Faff (2012), Akbar et al. (2017), Fan et al. (2019), Naeem et al. (2022), Kacem (2022), etc., we employ the GMM estimation. GMM also deals with endogeneity problems and reverse causality issues (Adams and Ferreira, 2009; Campbell and Mínguez-Vera, 2008). Hence, we continue our analysis by implementing the Blundell-Bond system GMM estimation (Blundell and Bond, 1998). According to Wintoki et al. (2012), the system-GMM controls for three types of endogeneity, specifically dynamic endogeneity, simultaneity, and unobserved heterogeneity. For bank performance, some characteristics of managers such as education and experience can bring value but cannot be directly incorporated into the model (Hermalin and Weisbach, 1988). Thus, system-GMM provides more consistent and efficient estimations. Additionally, we run Hansen and Arellano-Bond tests to check the reliability of the results.

To test the second and the fourth hypotheses, we exploit a short subsample including data for 2020–2021 only. The regression equation estimated by the OLS techniques with bank fixed effects is:

$$Dep_{it} = \gamma(COVID * RFEM_{it}) + \beta CONTROLS_{i,t-1} + \alpha_i + \varepsilon_{it} \quad (6)$$

where *COVID* is a measure of the COVID-19 intensity—the ratio of people contracted the disease in a particular country in a selected year to the population of this country in the same year.

*COVID*RFEM* captures the degree to which the presence of women on the bank board mitigates the negative consequences of higher country exposure to the pandemic. For bank profitability measures and the Z-score we expect a negative sign of the coefficient by the *COVID* measure and a positive sign of *COVID*RFEM.* A negative impact is expected for *NPL* and *LLR* as the multiplied variable is assumed to be associated with lower credit risk. Thus, we expect that the impact of women on stability and profitability is higher if the pandemic is more severe. We also expect that the negative contribution in riskiness is also increased in absolute value in accordance with the rise of pandemic severity.

To ensure the robustness of the results, we substitute the share of women on the board (*RFEM*) with the Blau index (*BLAU*). We estimate of all equations (4)–(6) using *ROA*, *ROE*, *ROAE*, and *ROAA* as measures of profitability, and *NPL*, *LLR*, *SCORE* as measures of riskiness.

Results and Discussion

The Impact of Women on Bank Profitability during the COVID-19 Crisis

We start with the estimation of equation (3) with profitability measures as dependent variables. The subsample analysis results are presented in Table 3. Generally, these results support *Hypothesis 1:* the contribution of women to bank profitability is statistically significant and positive whatever profitability measure is considered. During the period of favorable economic conditions, the effect for ROA and ROAA is much lower, and for ROE and ROAE it is insignificant. In all model specifications, however, the share of women on the board continuously improves performance, and the impact becomes greater during COVID-19. Hence, we conclude that women make a positive contribution to bank performance during the COVID-19 crisis. All the control variables that are significant for the regressions obtain the expected direction of influence on the performance measures.

Table 3 Subsample Analysis: Profitability Indicators

Variable	ROA		ROAA		ROE		ROAE	
	2015-2019	2020-2021	2015-2019	2020-2021	2015-2019	2020-2021	2015-2019	2020-2021
RFEM	0.234**	0.817***	0.243*	0.864*	0.131	0.167**	0.121	0.153**
	(0.331)	(0.433)	(0.328)	(0.449)	(0.055)	(0.064)	(0.045)	(0.060)
RBOARD	-25.777***	-26.013***	-27.006***	-25.114**	2.300**	1.546	2.396***	0.772
	(6.259)	(9.808)	(6.198)	(10.177)	(1.034)	(1.460)	(0.850)	(1.360)
AGE	-0.029	-2.968*	0.106	-3.153*	0.405*	-0.244	0.196	-0.338
	(1.310)	(1.729)	(1.297)	(1.795)	(0.216)	(0.257)	(0.178)	(0.240)
TENURE	5.924***	2.216	5.480***	2.602	0.307	0.358	0.359	0.538*
	(1.724)	(2.119)	(1.707)	(2.199)	(0.285)	(0.315)	(0.234)	(0.294)
LTA	-3.768	1.461	-4.465	1.293	-0.068	0.564	0.004	0.269
	(3.975)	(4.736)	(3.937)	(4.915)	(0.657)	(0.705)	(0.540)	(0.657)
TIER	4.033***	2.147*	3.956***	1.960	0.556***	0.389**	0.430***	0.348**
	(1.100)	(1.163)	(1.089)	(1.207)	(0.182)	(0.173)	(0.149)	(0.161)
CINC	-0.859***	-0.952***	-0.893***	-1.018***	-0.133***	-0.157***	-0.113***	-0.106**
	(0.188)	(0.315)	(0.186)	(0.327)	(0.031)	(0.047)	(0.026)	(0.044)
LGDP	23.111**	34.520***	20.867*	34.122**	2.324	3.485*	2.749*	2.133
	(10.798)	(12.665)	(10.693)	(13.142)	(1.784)	(1.886)	(1.467)	(1.756)
Observations	435	174	435	174	435	174	435	174
R^2	0.281	0.302	0.296	0.291	0.152	0.210	0.170	0.185
Adjusted R^2	0.143	0.144	0.161	0.130	-0.011	0.030	0.011	0.0004
F Statistic	17.804***	7.631***	19.128***	7.244***	8.176***	4.679***	9.329***	4.009***

$^{*}p<0.1$ $^{**}p<0.05$ $^{***}p<0.01$

The results of the dynamic estimation of equation (4) are presented Table 4. The share of women is strongly positive for ROA, and the multiplied variable is positive and significant at the 0.1% level for all the profitability variables. This is in line with the results obtained at the first step and supports *Hypothesis 1:* a higher proportion of women on bank boards is associated with higher bank profitability during the first two years of the pandemic. RFEM demonstrates no significant influence on bank performance measured in terms of ROE, implying that the impact of women on bank performance is likely to occur solely in crisis periods, remaining insignificant under favorable economic conditions.

Table 4. Profitability and COVID-19: effect of female directors, GMM estimations

Variable	ROA	ROAA	ROE	ROAE
RFEM	7.290***	5.476***	0.130	0.376
	(1.25e-05)	(0.000127)	(0.699)	(0.113)
DCOVID	-25.22***	-24.17***	-1.279***	-2.079***
	(0.121)	(0.112)	(0.659)	(0.368)
*RFEM*DCOVID*	18.85***	18.32***	2.796***	2.114***
	(0.000181)	(0.000109)	(0.000308)	(0.000790)
RBOARD	-21.6***	-27.8***	-30.64***	-25.21***
	(4.88e-06)	(2.75e-07)	(2.99e-10)	(6.26e-08)
AGE	-25.07***	-19.07***	-7.303***	-3.518***
	(0.000254)	(0.000206)	(3.01e-06)	(0.000537)
TENURE	25.35***	23.14***	4.163**	4.874***
	(0.000221)	(0.000203)	(0.0116)	(0.000341)
LTA	169.1***	151.0***	3.663	9.443***
	(5.49e-06)	(2.85e-06)	(0.189)	(0.000128)
TIER	-12.48***	-13.84***	-1.182***	-1.643***
	(0.00126)	(0.000233)	(0.00669)	(6.80e-05)
CINC	-1.379*	-1.836***	-0.316***	-0.382***
	(0.0638)	(0.00967)	(0.00701)	(4.67e-05)
LGDP	173.1***	172.8***	15.66*	21.83***
	(4.41e-05)	(1.25e-05)	(0.0530)	(0.00230)
Constant	-3,130**	-3,210***	194.7	-175.3
	(0.0127)	(0.00197)	(0.247)	(0.207)
Observations	435	435	435	435
Number of banks	87	87	87	87
AR(1)	0.005	0.000	0.001	0.001
AR(2)	0.160	0.191	0.022	0.017
Hansen test	0.366	0.300	0.420	0.108

*Note: p-values in parentheses *** p<0.01, ** p<0.05, * p<0.1 AR(1) stands for Arellano-Bond test for AR(1), AR(2) stands for Arellano-Bond test for AR(2), Hansen test is the test for overidentifying restrictions, for the test p-value is provided.*

A possible explanation might be that the channels of influence such as improved monitoring, innovation, and greater discussion are more valid in crisis periods. COVID-19 was impossible to predict and the pandemic was a period of substantial uncertainty. For bank directors, it is vitally important to stay open-minded to new ideas, be creative, and supportive to stakeholders. Thus, the best skills and qualities of women leaders were much more in demand during the COVID-19 crisis.

The Relationship between the Impact of Women on Performance and the Spread of COVID-19

To examine the second hypothesis, we apply the subsample over 2020–2021 to capture the diversity of the effect of women on boards on profitability depending on the country-level spread of COVID-19. We expect the positive relationship between the share of women directors and

bank profitability to be more pronounced in countries facing more severe pandemic pressure. The results of the FE estimation are in Table 5.

The coefficient of *COVID*RFEM*, which is interpreted as a measure of women's contribution to bank profitability during the pandemic with respect to its severity, have a positive sign, significant at the 1% level, in all model specifications. This result suggests that the more severe the spread of the pandemic, the stronger the positive input of women directors on bank performance during the COVID-19 pandemic. The share of women without reference to coronavirus severity is insignificant, which is in line with previous results. The signs of control variables are in line with the expectations for the statistically significant ones.

Table 5 Profitability and COVID-19 spread: the effect of women directors

Variables	ROA	ROAA	ROE	ROAE
*COVID*RFEM*	6.737***	6.981***	1.158***	1.194***
	(2.380)	(2.470)	(0.351)	(0.324)
RFEM	0.170	0.194	0.020	0.038
	(0.480)	(0.498)	(0.071)	(0.065)
RBOARD	-24.697**	-23.750**	1.320	0.539
	(9.584)	(9.945)	(1.413)	(1.305)
AGE	-2.968*	-3.153*	-0.243	-0.338
	(1.688)	(1.752)	(0.249)	(0.230)
TENURE	1.903	2.279	0.304	0.482*
	(2.071)	(2.149)	(0.305)	(0.282)
LTA	0.276	0.066	0.361	0.058
	(4.642)	(4.817)	(0.684)	(0.632)
TIER	1.770	1.569	0.324*	0.281*
	(1.143)	(1.186)	(0.169)	(0.156)
CINC	-1.051***	-1.120***	-0.174***	-0.124***
	(0.309)	(0.321)	(0.046)	(0.042)
LGDP	33.745***	33.319**	3.352*	1.995
	(12.365)	(12.831)	(1.823)	(1.683)
Bank FEs	yes	yes	yes	yes
Observations	174	174	174	174
R^2	0.340	0.330	0.267	0.257
Adjusted R^2	0.184	0.172	0.094	0.082
F Statistic	8.011***	7.646***	5.661***	5.392***

$^{*}p<0.1^{**}p<0.05^{***}p<0.01$

Therefore, we provide the support for *Hypothesis 2*: the positive impact of women on bank performance during the COVID-19 crisis is more pronounced if its intensity in a country is higher. This finding highlights the vitally important role of board diversity in crisis decision-

making procedures. Women leaders are more concerned with the problems related to the pandemic in a broad sense. The higher share of the number of new COVID-19 cases itself negatively affects bank performance by degrading the economic situation in the country, however, our results emphasizes that it is women directors who improve efficiency during the crisis.

The Impact of Women on Bank Risk during the COVID-19 Crisis

In this section we apply the same estimation steps and techniques to analyze the relationship between the share of women directors and bank riskiness during the pandemic. In all the specifications we employ *LLR*, *NPL*, and *SCORE* as risk measures.

Table 6. Subsample analysis: Risk Indicators

	LLR		NPL		SCORE	
Variable	2015-2019	2020-2021	2015-2019	2020-2021	2015-2019	2020-2021
RFEM	-0.039**	-0.064**	-0.065	-0.048*	0.050	0.676
	(0.029)	(0.012)	(0.042)	(0.029)	(0.263)	(0.636)
RBOARD	0.390	0.523**	0.259	1.078*	-2.610	2.914
	(0.454)	(0.242)	(0.666)	(0.591)	(4.142)	(12.866)
AGE	0.229*	0.118**	0.375**	0.283**	-0.472	-2.008
	(0.123)	(0.052)	(0.180)	(0.127)	(1.119)	(2.774)
TENURE	-0.725***	-0.262***	-1.218***	-0.394***	3.853***	-0.990
	(0.145)	(0.061)	(0.212)	(0.148)	(1.320)	(3.227)
CAPITAL	-0.804***	-0.348***	-1.483***	-0.667***	-1.746	-3.653
	(0.147)	(0.054)	(0.216)	(0.133)	(1.341)	(2.891)
LOANS	-0.150	0.059	-0.148	0.163	0.526	2.293
	(0.107)	(0.057)	(0.157)	(0.139)	(0.973)	(3.030)
LGDP	-3.263***	-1.759***	-6.835***	-2.925***	9.857	16.433
	(0.881)	(0.344)	(1.294)	(0.840)	(8.043)	(18.272)
Bank FEs	yes	yes	yes	yes	yes	yes
Observations	435	174	435	174	435	174
R^2	0.161	0.475	0.220	0.313	0.030	0.038
Adjusted R^2	0.003	0.360	0.073	0.163	-0.154	-0.172
F Statistic	10.024***	18.319***	14.716***	9.245***	1.605***	0.807***

$^{*}p<0.1$ $^{**}p<0.05$ $^{***}p<0.01$

We start with testing the third hypothesis. The results for subsample analysis are presented in Table 6. Not unambiguously for the profitability ratios but we observe evidence that there is a negative relationship between the share of women directors and bank credit risk during the COVID-19 years and this relationship is more pronounced compared to the preceding period. The effect on *LLR* is negative and significant both before and during the pandemic, but it is twice

as high during the crisis period than before. Women on bank boards influenced *NPL* only during COVID-19 and was insignificant throughout relatively favorable economic conditions. However, the impact of women on insolvency risk measured by *SCORE* cannot be confirmed, as the variable is insignificant for both subsamples.

Table 7 shows the results of system-GMM dynamic estimations. First of all, we observe a negative relationship between the share of women directors and bank *LLR* and *NPL*, which is even more pronounced in terms of the effect size during the COVID-19 years. Therefore, the negative impact of women during COVID-19 on this measure signifies that a greater share of women on the board encouraged banks to reduce the risk of the loan portfolio during the crisis even more than in stable times. Notably the results provide evidence for the reduction in the share of NPL and LLR, meaning that the impact of women is more pronounced when both the ex-post and ex-ante risks are considered. The banks with more women on their boards demonstrate more optimism on the on the loan portfolio quality, and there is a significant difference in the ex-post share of non-NPL in the loan portfolio. In this specification we did not find any evidence on the effect of gender diversity on the insolvency risk measured by *SCORE*.

Table 7. Bank risks and COVID-19: effect of female directors, GMM estimations

Variables	LLR	NPL	SCORE
RFEM	-0.780***	-1.335***	9.470
	(1.04e-06)	(1.91e-09)	(0.189)
DCOVID	33.48***	30.21***	-55.2***
	(1.05e-08)	(0.000226)	(0.183)
*DCOVID*RFEM*	-1.240***	-0.957***	19.54
	(6.57e-09)	(0.00121)	(0.166)
RBOARD	4.327***	7.198**	-84.8***
	(9.61e-05)	(0.0238)	(0.00955)
AGE	0.987*	-0.284	-3.948
	(0.0875)	(0.786)	(0.856)
TENURE	-3.015**	0.274	0.827
	(0.0174)	(0.836)	(0.981)
LTA	-10.10***	-9.222***	-21.6**
	(6.48e-07)	(0.000196)	(0.0290)
CAPITAL	-3.190***	-3.373**	19.4***
	(0.000965)	(0.0195)	(0.000298)
LOANS	2.731***	0.294	-99.67*
	(0.00511)	(0.687)	(0.0720)
LGDP	-4.781	-23.79***	72.9**
	(0.146)	(4.31e-07)	(0.0327)
			(0.525)
Constant	235.8***	508.0***	13,234**
	(3.87e-06)	(1.06e-09)	(0.0147)
Observations	435	435	435
Number of banks	87	87	87
AR(1)	0.000	0.000	0.005
AR(2)	0.000	0.001	0.048
Hansen test	0.274	0.367	0.148

*Note: pval in parentheses *** p<0.01, ** p<0.05, * p<0.1 AR(1) stands for Arellano-Bond test for AR(1), AR(2) stands for Arellano-Bond test for AR(2), Hansen test is the test for overidentifying restrictions, for the test p-value is provided*

The variable capturing the pure COVID-19 effects has a positive and significant coefficient for both *NPL* and *LLR*. It shows that during the pandemic credit risk increases significantly. This is an adequate result as lockdown restrictions led to economic activity dropping dramatically. Many people lost their jobs. Small businesses found themselves in trouble due to the lack of demand and supply chain disruptions. Numerous creditors failed to deal with their loan liabilities as a consequence of the COVID-19 crisis. All significant coefficients of the other control variables demonstrate the expected signs in both regressions.

Our results provide partial support for *Hypothesis 3*: women on boards are associated with lower ex-ante credit risk and the impact becomes more substantial throughout the pandemic. However, we cannot conclude that there are any effects of board gender diversity on banks' insolvency risk.

The Relationship between the Impact of Women on Riskiness and the Spread of COVID-19

The fourth hypothesis suggests that the impact of gender diversity on risk characteristics is more pronounced in countries with higher rates of COVID-19, as the importance of effective management increases with the rise of crisis intensity. Hence, the impact of gender diversity on risk indicators is likely to vary according to the incidence of COVID-19.

Table 8. Risks and COVID-19 incidence: the effect of women directors

Variables	LLR	NPL	SCORE
*COVID*RFEM*	-0.117*	-0.135	5.281
	(0.067)	(0.164)	(3.551)
RFEM	-0.028**	-0.035**	0.184
	(0.013)	(0.033)	(0.714)
RBOARD	0.506**	1.058*	-2.144*
	(0.241)	(0.592)	(12.822)
AGE	0.121**	0.285**	-2.112
	(0.052)	(0.128)	(2.763)
TENURE	-0.263***	-0.396***	-0.914
	(0.060)	(0.148)	(3.214)
CAPITAL	-0.345***	-0.664***	3.525*
	(0.054)	(0.133)	(2.880)
LOANS	0.053	0.156	2.563
	(0.057)	(0.140)	(3.023)
LGDP	-1.730***	-2.892***	15.148
	(0.342)	(0.842)	(18.215)
Bank FEs	yes	yes	yes
Observations	174	174	174
R^2	0.486	0.316	0.053
Adjusted R^2	0.369	0.161	-0.162
F-Statistic	16.650***	8.156***	0.988***

p<0.1p<0.05***p<0.01*

The results are presented in Table 8. *COVID*RFEM* captures the difference in the impact of women on risk depending on the spread of COVID-19 in different countries. A higher proportion of women on the board is associated with lower credit risk measured by *LLR* and the role of women increases with the morbidity rate. However, we cannot make the same conclusion for *NPL* and *SCORE* as the coefficient of variable of interest is insignificant. Consequently, there is not enough evidence to fully support *Hypothesis 4*.

Effects of Board Size

The banks in the sample are not homogeneous in terms of their board size. In this section, we check whether the impact of women directors on bank performance and bank risk during the COVID-19 pandemic varies along with board size. The additional analysis is primarily implemented to deal with inconsistent results about the impact of women on bank riskiness obtained above.

Table 9. FE Estimation for Performance Indicators: Banks Separated by Board Size

	ROA		ROAA		ROE		ROAE	
Variables	*LARGE*	*SMALL*	*LARGE*	*SMALL*	*LARGE*	*SMALL*	*LARGE*	*SMALL*
*DCOVID*RFEM*	9.066***	8.775***	9.359***	8.975***	1.669***	1. 063***	1.596***	1.208***
	(3.143)	(2.612)	(3.167)	(2.552)	(0.371)	(0.471)	(0.349)	(0.411)
RFEM	-0.648	0.526	0.622*	0.495**	-0.064	0.048	-0.044	0.054*
	(0.440)	(0.474)	(0.443)	(0.463)	(0.052)	(0.085)	(0.049)	(0.074)
DCOVID	-30.90***	-31.05***	-31.94***	-32.25***	-2.938**	-6.334***	-3.03***	-5.120***
	(10.034)	(9.566)	(10.113)	(9.344)	(1.186)	(1.725)	(1.114)	(1.503)
RBOARD	2.078	12.562***	2.065	-9.541***	-0.393**	-13.94***	-0.40***	17.54***
	(1.377)	(27.662)	(1.387)	(27.020)	(0.163)	(4.987)	(0.153)	(4.347)
AGE	0.997	0.042	1.158	0.225	0.076	0.138	0.088	-0.177
	(2.064)	(2.605)	(2.080)	(2.544)	(0.244)	(0.470)	(0.229)	(0.409)
TENURE	4.188	-1.63	4.383	-1.992	0.611*	-0.311	0.570*	-0.125
	(3.073)	(3.002)	(3.097)	(2.932)	(0.363)	(0.541)	(0.341)	(0.472)
LTA	-1.819	-20.885	-7.503	-21.242	0.929	4.466	-0.014	-0.779
	(25.200)	(31.033)	(25.398)	(30.312)	(2.978)	(5.595)	(2.798)	(4.877)
TIER	1.034	-2.943*	0.944	-3.157**	-0.187	-0.581**	-0.177	0.392
	(1.036)	(1.634)	(1.044)	(1.596)	(0.122)	(0.295)	(0.115)	(0.257)
CINC	-0.304	-0.145	-0.28	-0.142	-0.13***	0.069	-0.10***	0.025
	(0.234)	(0.386)	(0.236)	(0.377)	(0.028)	(0.070)	(0.026)	(0.061)
LGDP	-23.023	59.405	-27.51	56.629	-1.107	15.894*	0.773	9.119
	(41.391)	(50.114)	(41.716)	(48.950)	(4.891)	(9.035)	(4.595)	(7.875)
Bank FEs	yes	yes	yes	yes	yes	yes	yes	yes
Observations	305	305	305	305	305	305	305	305
R^2	0.092	0.159	0.099	0.159	0.162	0.226	0.151	0.156
Adjusted R^2	-0.122	-0.044	-0.114	-0.043	-0.036	0.04	-0.049	-0.047
F Statistic	2.505***	4.615***	2.697***	4.641***	4.742***	7.159***	4.387***	4.529***

p<0.1p<0.05***p<0.01*

Banks with larger boards are more likely to have more women on them. There is a stream of research on gender diversity topics that accounts for the critical mass of women directors (Birindelli, 2019; Kara et al., 2022). These papers generally state that the number of women directors on board should be more than 3 so that women's voices are heard. To account for board

size effects, we divide the sample into two subsamples by the median value of the board size. Equation (3) is estimated by the FE approach for both subsamples separately.

The impact of women on bank profitability depending on board size is presented in Table 9. The first subsample includes all the banks with a higher number of directors than the median number. The results are presented in the odd columns. The second subsample includes all the banks which have a number of directors below the median value. The results are presented in the even columns.

The multiplied variable *DCOVID*REM* is positive and significant in the model specifications, supporting the results we obtained for the whole sample. The impact of women directors during COVID-19 is consistently higher for the banks with larger boards. However, the difference between coefficients is not substantial.

Table 10. FE Estimation for Risk Indicators: Banks Separated by Board Size

Variable	LLR		NPL		SCORE	
	LARGE	*SMALL*	*LARGE*	*SMALL*	*LARGE*	*SMALL*
*DCOVID*REM*	-0.154**	-0.013	-0.228***	-0.052	2.045**	0.197
	(0.065)	(0.025)	(0.080)	(0.046)	(0.871)	(0.476)
RFEM	-0.098*	-0.020*	-0.094	-0.012*	-0.543	-0.084
	(0.052)	(0.020)	(0.063)	(0.037)	(0.694)	(0.387)
DCOVID	5.335***	1.558*	8.197***	4.227**	-50.977**	-5.371
	(1.916)	(0.885)	(2.327)	(1.631)	(25.507)	(16.890)
RBOARD	-0.3	-6.152***	-1.326	-9.182***	-13.59	22.389
	(0.882)	(12.938)	(1.072)	(23.856)	(11.748)	(247.006)
AGE	-0.045	-0.014	-0.343	-0.223	5.610*	-1.858
	(0.252)	(0.115)	(0.306)	(0.212)	(3.354)	(2.195)
TENURE	-0.174	-0.224*	-0.252	-0.207	-5.469	4.754*
	(0.352)	(0.128)	(0.428)	(0.235)	(4.688)	(2.438)
CAPITAL	-0.054	0.014	0.297	0.238	-3.09	1.329
	(0.335)	(0.187)	(0.407)	(0.345)	(4.462)	(3.572)
LOANS	-0.034	10.891***	-0.011	16.001***	1.221	-16.493
	(0.218)	(2.319)	(0.265)	(4.275)	(2.904)	(44.268)
LGDP	-6.55	0.312	-15.468***	3.305	-48.792	0.124
	(4.850)	(1.971)	(5.892)	(3.634)	(64.570)	(37.623)
Bank FEs	yes	yes	yes	yes	yes	yes
Observations	305	305	305	305	305	305
R^2	0.062	0.204	0.119	0.19	0.047	0.051
Adjusted R^2	-0.163	0.016	-0.093	-0.001	-0.182	-0.173
F Statistic	1.813*	6.996***	3.682***	6.411***	1.354***	1.469***

p<0.1p<0.05***p<0.01*

Estimating, in the same manner, the different impacts of women on bank riskiness, we obtained the results given in Table 10. For banks with large boards the impact of women on risk during the pandemic period is statistically significant whatever risk measure we consider. COVID-19 is associated with higher credit risk and lower stability measured by Z-score. However for banks with large boards, a greater presence of women directors mitigates these consequences for all risk measures: a higher share of women on boards is associated with lower ex-ante and ex-post

credit risk and a lower insolvency risk. This might be a possible explanation for the ambiguous results obtained in the previous section: while the impact of women on performance indicators during the pandemic varies slightly in absolute terms depending on the board size, the impact of women on risk measures during the pandemic disappears for banks with smaller boards.

A possible explanation might be that banks with a larger number of directors tend to have wider discussions considering management decisions. More directors mean there is likely to be a broader range of opinions and boards pay more attention to the efficiency of their solutions. Consequently, women are more likely to be heard because larger boards are more open-minded to innovative approaches. If the absolute number of women is higher, they probably have stronger mutual power during board meetings.

Remarkably, board size itself is associated with reduced credit risk of small banks. Board size is generally considered to worsen bank performance and increase riskiness because of possible communication problems within a large number of directors.

Bank Board Gender Diversity and COVID-19 Pressure

Initially, we use different performance and risk measures for all the estimations to provide evidence that the results are consistent. Different estimation techniques exploited in the previous sections also contribute to the strength of the results. To ensure our results are robust to the way we measure gender diversity, in this section we employ the Blau index instead the RFEM and re-estimate Equations (4)–(6).

We start with the subsample estimations and comparisons, the results for both risk and profitability are presented in Table A2 in Appendix. The coefficient of *BLAU* is positive and significant in model specifications with *ROA, ROAA,* and *ROAE* before and during the pandemic period. However, before the pandemic the significance is marginal and during the COVID-19 crisis the relationship is statistically significant, and the size of the effect is almost twice as large. As for the risk measures, the gender diversity indicator is significant in the *LLR* model. We also obtained evidence—however, quite weak—for the negative relationship between *BLAU* and *NPL*, measuring the ex-post credit risks. The size of the effect is larger for the pandemic period. Thus, the alternative model specification estimation strengthens the findings.

Table A3 in Appendix gives the results of system-GMM estimations of Equation (5) with both performance and risk indicators for the Blau index. The coefficients by the multiplied variable remain positive and significant for all the profitability variables. Although COVID-19 itself has a significant and negative impact on bank performance, this contribution of the COVID-19

variable is partly mitigated by board gender diversity. As for risk, the pandemic witnessed an increase in ex-ante credit risk measures (*NPL* and *LLR*), however a negative and significant impact of the diversity index on both *NPL* and *LLR* is confirmed as well as insignificant results regarding *NPL* and *SCORE*.

Table A4 in Appendix shows the results for Equation (6) estimations aimed to test the second and fourth hypotheses with alternative measure of the board gender diversity. The variable of our interest is *COVID*BLAU*. The effect of this variable is positive and significant for all the profitability model specifications: although higher exposure to infection is associated with lower returns on both assets and equity, this effect is mitigated in banks with more diversified boards. These results partially support the fourth hypothesis as well. A higher proportion of a country's population hit by COVID-19 is associated with higher credit risk measured by *LLR*. The impact of women directors on *LLR* increases along with the rise of COVID-19 severity and the coefficient is negative and significant. Finally, as in the main body of the research, we do not obtain significant results for the model specifications with *NPL* and *SCORE* as dependent variables.

Finally, we repeated the analysis examining the role of board size. Subsample estimations with the Blau index instead of the female ratio confirm the previously obtained results (see Table A5 in Appendix). The impact of women directors on bank profitability indicators during the COVID-19 pandemic persists and is positive and significant for banks with any board size. The size of the effect does not statistically differ for the banks with larger or smaller boards.

The impact on the reduction of credit risk measured by both *LLP* and *NPL* during the pandemic is identified again for the banks with larger boards. For those with smaller boards the effect is economically and/or statistically marginally significant or insignificant. Our results also provide evidence that the influence of women directors on insolvency risk improvement during the crisis persists for the banks with larger boards.

Conclusion

In this paper the relationship between corporate governance and such important issues as bank profitability and bank riskiness during the COVID-19 pandemic is examined by employing gender diversity indicators. Specifically, we exploit a detailed data set which covers the period 2015–2021. The sample includes 87 banks located in Europe and the UK.

Our main finding is that the impact of women directors on bank profits and on bank riskiness—in terms of credit risks—was significant during the COVID-19 pandemic compared with the

previous period, which can be characterized as relatively favorable in terms of economic conditions. We demonstrate that there is a positive and significant relationship between gender diversity indicators and bank performance in 2020–2021, while in 2015–2019 the impact is lower or even insignificant. The positive impact of women board members on bank performance during the COVID-19 crisis is shown to be more pronounced in the countries where the incidence is higher.

We prove that the negative contribution of women directors to credit risk is also more pronounced during the pandemic compared with the previous period especially in countries with the higher incidence rates. However, the positive and significant contribution of women directors to the reduction of insolvency risk is proven only for banks with larger boards.

This research highlights that gender diversity has become more urgent, especially in a black-swan crisis. Our findings might be of interest for bank clients with long-term investment horizons as they are highly risk-averse and aim to minimize possible uncertainties and the negative effects of unexpected shocks. Board gender diversity might be one of the viable characteristics to consider when choosing the best investment option.

This research also contributes to the understanding the consequences of COVID-19 for the financial sector. The pandemic was an unanticipated negative economic shock apart from being a humanitarian disaster. Unprecedented measures were taken by most governments to prevent the incredibly rapid spread of disease. Lockdowns were a major stress both for people confined in their homes and companies facing a lack of demand. It is vitally important to draw lessons from best practices to mitigate the negative consequences of future crises. Results such as ours, obtained during such a severe crunch, could be used to deal with prospective challenges. The greater representation of women on bank boards increases the probability of going through critical situations more successfully. This can be explained by such inputs into corporate governance as creativity and innovativeness along with improved networking and communication.

This is in line with resource dependence theory which claims that the presence of women improves the effectiveness of decision-making processes, as women have specific traits of character, unique sets of skills, and particular backgrounds compared to men. Women leaders incorporate additional approaches to solving problems, and, thus, they bring a broader view. Our claims comply with agency theory as well. Improved monitoring and control of boards associated with women directors become more essential in a crisis.

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Appendix

Table A1. Variables Description

Variable	Units	Description	Source
Dependent Variables – Profitability			
ROA	%	Return on Assets	BankFocus
ROE	%	Return on Equity	BankFocus
ROAA	%	Return on Average Assets	BankFocus
ROAE	%	Return on Average Equity	BankFocus
Dependent Variable – Risk			
LLR	%	Loan loss reserves / gross loans	BankFocus
NPL	%	Non-performing loans / gross loans	BankFocus
SCORE	index	Z-score = (ROA + TE / TA) / SD (ROA)	BankFocus
COVID-19 Controls			
DCOVID	dummy	Dummy variable (equals 1 in 2020 and 2021, and 0 otherwise)	World Bank
COVID	%	Ratio of people experienced COVID-19 over population of a country	World Bank
Board Controls			
RFEM	%	Number of women on board / total number of directors	BoardEx
BLAU	index	Blau Index	BoardEx
RBOARD	%	Total number of directors / total assets	BoardEx
AGE	years	Average age of board members	BoardEx
TENURE	years	Average tenure on board of board members	BoardEx
Bank Controls – Profitability			
LTA	log	Logarithm of total assets	BankFocus
TIER	%	Tier 1 capital ratio	BankFocus
CINC	%	Efficiency ratio	BankFocus
Bank Controls – Risk			
LTA	log	Logarithm of total assets	BankFocus
CAPITAL	%	Capital funds / TA	
LOANS	%	Gross loans / TA	
Country Control			
LGDP	log	Logarithm of GDP per capita	World Bank

Table A2. Subsample analysis with Blau index: Profitability and Risk Indicators

Variable	ROA		ROAA		ROE		ROAE		LLR		NPL		SCORE	
	2015-2019	2020-2021	2015-2019	2020-2021	2015-2019	2020-2021	2015-2019	2020-2021	2015-2019	2020-2021	2015-2019	2020-2021	2015-2019	2020-2021
BLAU	0.491*	0.931***	0.497*	0.998***	0.172	0.229**	0.162**	0.188***	-0.049***	-0.085***	-0.062**	-0.092*	0.019	0.561
	(0.329)	(0.519)	(0.326)	(0.538)	(0.054)	(0.077)	(0.044)	(0.072)	(0.028)	(0.014)	(0.041)	(0.035)	(0.255)	(0.758)
RBOARD	-24.961***	-25.426**	-26.191***	-24.483**	2.014*	1.435	2.199***	0.652	0.331	0.515**	0.187	1.066*	-2.676	2.944
	(6.273)	(9.827)	(6.211)	(10.194)	(1.027)	(1.457)	(0.847)	(1.359)	(0.451)	(0.241)	(0.664)	(0.590)	(4.145)	(12.896)
AGE	0.151	-2.895*	0.284	-3.076*	0.453**	-0.232	0.228	-0.324	0.216*	0.108**	0.360**	0.271**	-0.481	-1.824
	(1.308)	(1.731)	(1.296)	(1.796)	(0.214)	(0.257)	(0.177)	(0.239)	(0.122)	(0.052)	(0.180)	(0.127)	(1.120)	(2.773)
TENURE	5.796***	2.154	5.349***	2.538	0.228	0.349	0.303	0.527*	-0.694***	-0.252***	-1.185***	-0.383**	3.836***	-1.226
	(1.716)	(2.121)	(1.700)	(2.200)	(0.281)	(0.314)	(0.232)	(0.293)	(0.144)	(0.060)	(0.211)	(0.147)	(1.319)	(3.220)
LTA	-4.503	1.376	-5.192	1.168	-0.258	0.489	-0.122	0.215						
	(3.972)	(4.773)	(3.934)	(4.951)	(0.650)	(0.708)	(0.537)	(0.660)						
TIER	4.171***	2.553**	4.095***	2.398*	0.617***	0.470***	0.473***	0.433**						
	(1.102)	(1.208)	(1.091)	(1.254)	(0.180)	(0.179)	(0.149)	(0.167)						
CINC	-0.839***	-0.922***	-0.874***	-0.983***	-0.130***	-0.147***	-0.112***	-0.097**						
	(0.187)	(0.323)	(0.185)	(0.335)	(0.031)	(0.048)	(0.025)	(0.045)						
CAPITAL									-0.784***	-0.339***	-1.458***	-0.653***	-1.779	3.804**
									(0.146)	(0.055)	(0.214)	(0.134)	(1.338)	(2.924)
LOANS									-0.133	0.063	-0.129	0.168	0.532	2.204
									(0.106)	(0.057)	(0.156)	(0.139)	(0.976)	(3.034)
LGDP	23.059**	34.477***	20.819*	34.013**	2.343	3.367*	2.764*	2.056	-3.439***	-1.859***	-7.038***	-3.053***	9.744*	17.5
	(10.771)	(12.708)	(10.665)	(13.183)	(1.763)	(1.884)	(1.455)	(1.758)	(0.879)	(0.344)	(1.295)	(0.842)	(8.076)	(18.393)
Bank FEs	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	435	174	435	174	435	174	435	174	435	174	435	174	435	174
R^2	0.285	0.3	0.299	0.29	0.172	0.215	0.183	0.188	0.171	0.479	0.226	0.316	0.03	0.034
Adjusted R^2	0.147	0.142	0.165	0.129	0.013	0.036	0.026	0.003	0.015	0.365	0.079	0.166	-0.154	-0.177
F Statistic	18.104***	7.570***	19.443***	7.198***	9.444***	4.816***	10.225***	4.070***	10.791***	18.617***	15.206***	9.356***	1.600***	0.721***

p<0.1p<0.05***p<0.01*

Table A3. Bank profitability, risks and COVID-19: effect of Blau index, GMM

VARIABLES	ROA	ROAA	ROE	ROAE	LLR	NPL	SCORE
BLAU	5.263***	4.164***	0.143	-0.100	-0.698***	-1.130***	10.78
	(0.000114)	(0.000787)	(0.611)	(0.627)	(1.43e-08)	(0.01)	(0.102)
DCOVID	-32.48**	-28.43**	-1.876	-2.845	39.53***	36.54***	-214.4
	(0.0275)	(0.0494)	(0.510)	(0.207)	(9.05e-11)	(1.31e-05)	(0.745)
*DCOVID*BLAU*	262.6***	264.5***	31.01***	27.41***	-19.4***	-16.70***	22.2
	(5.03e-08)	(7.58e-09)	(6.55e-11)	(5.02e-10)	(6.31e-11)	(0.000106)	(0.711)
RBOARD	-18.56***	-15.83***	-6.890***	-2.872***	3.666***	-4.789	-67.7***
	(0.00155)	(0.000774)	(1.32e-06)	(0.00154)	(0.000327)	(0.107)	(0.00925)
AGE	22.55***	21.41***	4.602***	5.527***	0.693	-0.0612	-9.767
	(0.000294)	(0.000298)	(0.00292)	(2.69e-05)	(0.166)	(0.950)	(0.549)
TENURE	170.4***	154.9***	2.784	9.539***	-2.863**	-0.460	13.09
	(4.92e-07)	(4.54e-07)	(0.330)	(9.59e-05)	(0.0141)	(0.720)	(0.585)
LTA	-12.06***	-13.32***	-1.108**	-1.456***			
	(0.000940)	(0.000272)	(0.0121)	(0.000532)			
TIER	-1.540**	-1.996***	-0.325***	-0.379***			
	(0.0235)	(0.00315)	(0.00554)	(4.39e-05)			
CINC	174.8***	173.3***	18.09**	25.42***			
	(6.11e-06)	(4.20e-06)	(0.0166)	(0.000209)			
LTA					-9.185***	-8.155***	-160.1**
					(6.71e-07)	(0.000458)	(0.0139)
CAPITAL					-3.156***	-4.164***	-115.9***
					(0.000284)	(0.00233)	(3.07e-05)
LOANS					2.822***	0.392	78.12*
					(0.00144)	(0.571)	(0.0854)
LGDP	-111.1**	-79.64	-3.903	-6.950	-5.960*	-26.45***	-560.9**
	(0.0323)	(0.113)	(0.644)	(0.337)	(0.0614)	(3.90e-09)	(0.0363)
Constant	-3,588***	-3,501***	152.7	-259.3**	251.5***	517.6***	10,041***
	(0.00161)	(0.000360)	(0.329)	(0.0445)	(1.34e-07)	(0)	(0.00810)
Observations	435	435	435	435	435	435	435
Number of banks	87	87	87	87	87	87	87
AR(1)	0.000	0.003	0.001	0.000	0.000	0.000	0.000
AR(2)	0.226	0.250	0.017	0.043	0.000	0.003	0.024
Hansen test	0.128	0.121	0.426	0.127	0.388	0.398	0.121

*Note: pval in parentheses *** p<0.01, ** p<0.05, * p<0.1 AR(1) stands for Arellano-Bond test for AR(1), AR(2) stands for Arellano-Bond test for AR(2), Hansen test is the test for overidentifying restrictions, for the test p-value is provided*

Table A4. Bank profitability, risks and COVID-19 spread: effect of Blau index

Variable	ROA	ROAA	ROE	ROAE	LLR	NPL	SCORE
*COVID*BLAU*	5.240***	5.436***	0.877***	0.904***	-0.111**	-0.138	4.189
	(1.861)	(1.931)	(0.274)	(0.253)	(0.053)	(0.131)	(2.846)
BLAU	0.371	0.417	0.079	0.092	-0.038**	-0.048*	0.143
	(0.544)	(0.565)	(0.080)	(0.074)	(0.015)	(0.037)	(0.807)
RBOARD	-24.239**	-23.251**	1.236	-0.447	0.492**	1.038*	2.091
	(9.603)	(9.962)	(1.412)	(1.307)	(0.239)	(0.591)	(12.857)
AGE	-2.895*	-3.075*	-0.232	-0.324	0.110**	0.273**	-1.907
	(1.690)	(1.753)	(0.249)	(0.230)	(0.051)	(0.127)	(2.763)
TENURE	1.921	2.296	0.31	0.486*	-0.256***	-0.387***	-1.100*
	(2.072)	(2.150)	(0.305)	(0.282)	(0.060)	(0.147)	(3.208)
LTA	0.321	0.074	0.313	0.033			
	(4.675)	(4.850)	(0.688)	(0.636)			
TIER	2.118*	1.946	0.397**	0.358**			
	(1.190)	(1.234)	(0.175)	(0.162)			
CINC	-1.017***	-1.082***	-0.163***	-0.113***			
	(0.317)	(0.329)	(0.047)	(0.043)			
CAPITAL					-0.337***	-0.651***	3.742*
					(0.054)	(0.134)	(2.912)
LOANS					0.055	0.158	2.5
					(0.056)	(0.139)	(3.029)
LGDP	33.455***	32.952**	3.196*	1.88	-1.815***	-2.999***	15.867
	(12.412)	(12.876)	(1.826)	(1.690)	(0.341)	(0.843)	(18.351)
Bank FEs	yes	yes	yes	yes	yes	yes	yes
Observations	174	174	174	174	174	174	174
R^2	0.338	0.328	0.268	0.255	0.495	0.321	0.049
Adjusted R^2	0.182	0.17	0.096	0.08	0.38	0.167	-0.167
F Statistic	7.940***	7.593***	5.701***	5.332***	17.242***	8.332***	0.906***

p<0.1p<0.05***p<0.01*

Table A5. FE estimation for profitability and Risk Indicators with Blau index: Banks Separated by Board Size

Variable	ROA		ROAA		ROE		ROAE		LLR		NPL		SCORE	
	LARGE	*SMALL*	*LARGE*	*SMALL*	*LARGE*	*SMALL*	*LARGE*	*SMALL*	*LARGE*	*SMALL*	*LARGE*	*SMALL*	*LARGE*	*SMALL*
*DCOVID*BLAU*	6.619***	7.329***	6.910***	7.492***	0.834***	1.432***	0.932***	1.350***	-19.156***	-3.737	-27.578***	-11.681*	17.289*	21.843
	(2.385)	(2.199)	(2.404)	(2.148)	(0.282)	(0.394)	(0.265)	(0.345)	(6.894)	(3.506)	(8.386)	(6.465)	(92.782)	(67.266)
BLAU	-0.606	1.003*	-0.596	0.962*	-0.046	0.179*	-0.036	0.146	-0.101**	-0.039	-0.085	-0.035	-0.282	0.034
	(0.374)	(0.589)	(0.377)	(0.575)	(0.044)	(0.106)	(0.042)	(0.092)	(0.044)	(0.024)	(0.053)	(0.044)	(0.589)	(0.461)
DCOVID	- 30.316***	- 33.258***	- 31.507***	- 34.457***	-3.113**	-7.017***	-3.161***	-5.615***	8.103***	2.659*	12.134***	7.418***	-61.457*	-1.105
	(10.272)	(9.971)	(10.350)	(9.741)	(1.212)	(1.789)	(1.140)	(1.564)	(2.632)	(1.535)	(3.202)	(2.830)	(35.426)	(29.446)
RBOARD	2.097	91.065***	2.078	84.438***	0.399**	28.854***	0.409***	15.809***	-0.205	-6.554***	-1.211	-9.753***	-13.231	17.961
	(1.373)	(28.348)	(1.384)	(27.694)	(0.162)	(5.085)	(0.152)	(4.445)	(0.873)	(13.297)	(1.062)	(24.525)	(11.745)	(255.159)
AGE	1.042	0.113	1.176	0.301	0.1	0.161	0.096	-0.159	-0.016	-0.002	-0.296	-0.193	6.008*	-1.991
	(2.028)	(2.604)	(2.043)	(2.544)	(0.239)	(0.467)	(0.225)	(0.408)	(0.246)	(0.114)	(0.299)	(0.211)	(3.313)	(2.195)
TENURE	4.033	-1.72	4.248	-2.081	0.587	-0.323	0.555	-0.138	-0.175	-0.218*	-0.264	-0.195	-5.764	4.746*
	(3.057)	(2.999)	(3.080)	(2.930)	(0.361)	(0.538)	(0.339)	(0.470)	(0.349)	(0.127)	(0.424)	(0.234)	(4.690)	(2.440)
LTA	-2.757	-28.601	-8.588	-28.666	0.786	2.637	-0.162	-2.116						
	(25.247)	(31.564)	(25.439)	(30.836)	(2.980)	(5.662)	(2.801)	(4.949)						
TIER	0.94	2.572	0.854	2.792*	-0.186	0.475	-0.172	0.317						
	(1.051)	(1.654)	(1.059)	(1.615)	(0.124)	(0.297)	(0.117)	(0.259)						
CINC	-0.306	-0.099	-0.281	-0.097	-0.136***	0.076	-0.100***	0.032						
	(0.234)	(0.385)	(0.236)	(0.377)	(0.028)	(0.069)	(0.026)	(0.060)						
CAPITAL									-0.088*	0.003	0.291	0.222	-2.6	1.334
									(0.334)	(0.186)	(0.406)	(0.343)	(4.493)	(3.573)
LOANS									-0.006	10.178***	0.012	15.327***	1.284	-13.583
									(0.217)	(2.381)	(0.264)	(4.392)	(2.923)	(45.693)
LGDP	-26.424	56.514	-30.827	53.77	-1.507	15.353*	0.389	8.662	-6.882	0.473	-15.897***	3.374	-54.528	0.878
	(41.269)	(50.066)	(41.583)	(48.912)	(4.871)	(8.981)	(4.579)	(7.851)	(4.793)	(1.958)	(5.830)	(3.611)	(64.501)	(37.570)
Bank FEs	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	305	305	305	305	305	305	305	305	305	305	305	305	305	305
R^2	0.092	0.16	0.099	0.16	0.164	0.235	0.152	0.161	0.075	0.212	0.129	0.198	0.04	0.051
Adjusted R^2	-0.122	-0.043	-0.113	-0.042	-0.034	0.051	-0.047	-0.041	-0.147	0.026	-0.081	0.008	-0.191	-0.173
F Statistic	2.504***	4.656***	2.711***	4.673***	4.809***	7.524***	4.425***	4.694***	2.220**	7.338***	4.036***	6.730***	1.139***	1.460***

p<0.1p<0.05***p<0.01*