FINANCIAL EXPERTS ON THE BOARD: DOES IT MATTER FOR THE PROFITABILITY AND RISK OF THE U.K. BANKING INDUSTRY?

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Abstract

This paper explores the relation between board-level financial expertise, the profitability and the risk profile with panel data from the UK banking industry. The empirical findings document that collectively, financial experts have a positive influence on the performance outcomes of banks, they contribute to higher risks, especially in the case of large banks, while they improve the stock performance of the associated banks. Moreover, the results highlight that board-level qualified accountants have no statistical effect on that profitability, while such a positive link is established for the case of financial and banking professors, as well as for financial experts from other industries. Such findings imply that these two groups of professional financial experts may be easier adopted at group-level profits enhancement. Robustness checks confirm the results for all types of banking institutions, except those with a strong real-estate activity portfolio. Finally, certain commercial and/or policy implications of the results are reported.

JEL Classification: G20; G21; G24; G32; C33

I. Introduction

Fama and Jensen (1983) argue that the board of directors has a great responsibility for the effective allocation and use of corporate resources, while financial reporting and monitoring require a certain level of financial expertise across directors, given that a key function of corporate governance is to ensure that firms avoid bankruptcy (Darrat et al., 2015). Moreover, board-member financial acumen is also important in highly financial regulated sectors, such as the banking sectors (Kim et al., 2014), while sound accounting helps to promote stewardship, as well as the supply of decision-making information to internal and external users. As a result, accounting and finance expertise on the board are expected to be substantially linked to high-quality reporting, as well as enhanced investor confidence (Defond et al., 2005; kim et al., 2014). Harris and Ravin (2008) also show that financial experts in banking boards imply lower costs in acquiring information about the complexity and certain risks linked to a number of financial transactions, thus mitigating any inefficiencies in monitoring senior management.

There is a specific strand in the literature of corporate governance that explicitly examines the role of personal idiosyncratic characteristics in relevance to

the managerial experience and technical knowledge of board directors and the association of those characteristics with firms' performance (Masulis et al., 2012; Kim et al., 2014), while others document that there is weak evidence that the financial expertise of board directors impacts in a statistically significant manner on corporate results (Defond et al., 2005; Hoitash et al., 2009). Our study is close to the literature that explores how certain governance mechanisms, such as the board structure, affect the performance of banking institutions. Raheja (2005) notes that in complex and risky firms, such as banks, board-level financial experts lead to the reduction of verification costs in relevance to financial information, which promotes the efficiency and reliability of the external audit function. Overall, based on the mechanism of the agency theory, the presence of such persons as directors serves the interests of capital providers. The presence of accountants as financial experts on boards also emphasizes the role of reporting of financial information as the primary interest to creditors, shareholders and potential investors (Watts and Zimmerman, 1986). In other words, it is the realization of accounting earnings, proxied by the net profit margin, the return on assets and the return on equity that matters when professionally qualified accountants predominate on the board.

By contrast, others have documented the absence of any statistical association between the board structure and the performance of banking firms. Booth et al. (2002) provide evidence on the role of internal monitoring mechanisms, e.g. outside directors, for the banking industry. They document that the presence of such mechanisms is not very strong, comparatively in other sectors, such as the industrial sector. Moreover, others assert that the proportion of directors maintaining an employment relationship with the bank (i.e., inside directors), as well as all other directors (i.e., outside directors) does not have any statistically significant impact on bank performance (Griffith et al., 2002; Adams and Mehran, 2008). Staikouras et al. (2007) reach the same conclusion after examining the effect of the executive and non-executive directors' ratio upon bank performance.

This study is also close to the strand of the literature on the relationship between board members characteristics and the financial effectiveness of corporate governance. The novelties of such an approach are manifold. First, evidence on the link between board-level financial expertise matters in terms of banks' financial performance seems to be important in terms of shaping future governance guidelines

and practices, while no relevant study, to the best of our knowledge, appears in the literature. Second, the selection of banks of different size and governance structures enables research to benefit from increased within sample variation, while it mitigates potential selection bias in relevance to studies that use data drawn from publicly traded banks. Third, the appointment of financially equipped directors into boards can be important for the viability of non-bank financial institutions that are also involved in risky lending business and developing new risky financial products. Hence, the underlying empirical findings could be of equal importance for firms beyond the banking industry, such as those in the insurance industry. Fourth, the use of panel methodology will significantly assist to alleviate endogeneity concerns resulting from unobserved bank-level heterogeneity.

At the same time, a number of European countries have enacted regulations since the 2007-09 financial crisis that requires senior managers and directors to demonstrate they have requisite expertise in financial matters. More specifically, the Basel Committee's October 2010 *Principles for enhancing corporate governance*, in collaboration with country regulatory authorities represented a consistent development in certain efforts to promote sound corporate governance practices for banks. One of those practices was closely associated with substantial progress in employing collective board skills and qualifications. The Committee revisited the 2010 guidance in 2015 by providing stricter rules with respect to the qualifications a certain number of board of directors should hold. In that sense, the board must be suitable to carry out its responsibilities and have a composition that facilitates effective oversight. For that purpose, the board should be comprised of a sufficient number of independent directors with specialized skills and expertise commensurate with the size, complexity and the risk profile of the bank. Therefore, relevant areas of competence may include capital markets, financial analysis, financial stability issues, financial reporting, information technology, strategic planning, risk management, compensation, regulation, corporate governance and management skills (Basel Committee on Banking Supervision, 2015).

Based on the above discussion and facts, this study continues this line of research and investigates how the financial expertise in the boards of directors affects bank performance (profitability) in a sample of U.K. banks. It provides supportive evidence on the necessity to have financial experts on the board of directors in the

banking sector, a sector that significantly determines the course of the real economy, especially after the 2008 financial crisis experience. It further continues the paper by Minton et al. (2014) who examine how financial expertise among board directors affects the stock performance in a sample of U.S. banks. Their findings highlight the presence of a positive link between financial expertise and risk taking only prior to the financial crisis, as well as with a lower stock performance, only in the financial crisis period. Our study uses longitudinal data, spanning the period 2001 to 2016 on banking institutions data drawn from the UK' banking industry to provide, for the first time, empirical evidence on the effect of financial expertise on banks' profitability. An additional novelty of the paper is that it explicitly considers three specific categories of financial expertise, i.e. financial and banking professors, professionally qualified accountants, and financial and experts from other industries, on a number of measures of banking industry profitability, i.e. return on assets, return on equity, and net profit margin. Finally, the analysis documents that the baseline results seem to hold for the majority of banks under study, except those with a strong real estate portfolio of activities.

II. Methodology

The econometric model that examines the empirical link between board-level financial experts and the performance of the US banking institutions is that of the GMM methodological approach. The model is described as follows:

$$PERi_t = a_i + b_i + c_1\, FINEXP_{it} + d'\, X'_{it} + v_{it}$$

where i denotes the ith banking institution and t time. a_i and b_i denote bank and time fixed effects, respectively, while PER is one of the three dependent profitability variables, i.e. interest margin (INTMAR), return on assets (ROA) and returns on equity (ROE). X'_{it} denotes a vector of a number of control variables explained shortly. Finally, v_{it} denotes the error component of the model.

The model considers a number of control variables that determine the performance of a banking institution. More specifically, such controls involve the banking industry's concentration (HERF), and operating expenses management (OEM). The first determinant is the Herfindahl index (HERF), which captures the

market power for individual banks. The index is defined as the squares of individual bank asset shares in the total banking sector assets for an individual bank. The market power evidence argues that a higher (lower) level of concentration leads to more (less) monopolistic-type of profits, although higher (lower) concentration in the banking sector is associated with less efficient capital markets and, accordingly, with a slower reallocation of capital and, thus, with slower growth (Cetorelli and Strahan, 2006). Goddard et al. (2004), as well as Hahn (2008), find a negative influence of the degree of competition on bank profits. The efficient structure hypothesis, by contrast, assumes that banks with superior management can have lower costs and, therefore, higher profits. These banks will be able to gain market share over time, leading to a higher market concentration (Berger, 2007). As higher market concentration is likely to contribute to higher margins, the estimated coefficient in our model is expected to have a positive sign. Operating expenses (OEM) also seem to play a substantial role as a determinant of bank performance. Bourke (1989) provides evidence in favor of a positive relationship between the two variables. The operating costs are proxied by the ratio of non-interest expenses to total assets; a positive estimated coefficient is expected because higher operational costs may cause higher profits. We also adopt the ratio of equity to total assets as a proxy for bank risk aversion (Maudos and Fernandez de Guevara, 2004) and capital strength; higher risk aversion may lead to higher profits, therefore, the estimated coefficient for CAP is expected to be positive. Measures of the credit risk and asset quality of banks, proxied by the ratio of loan loss reserves to total loans, is also used as a control driver. Banks with higher ratios of loan loss reserves face higher credit risk, which is likely to be transferred to customers, resulting in higher profitability. Credit risk is considered to be a significant determinant of profitability since it is related to the presence of bank failures. Jimenez and Saurina (2006) argue that bank's lending hazards are much higher during the boom phase of a cycle than in the midst of a recessionary period. The literature offers a bunch of explanations for such behavior, i.e. the principal agency problem through which managers aim at growth objectives instead of profitability targets (Mester, 1989). As a result, bank managers opt for higher loan growth and lower the quality loan standards. In addition, the herd behavior hypothesis supports that bad loan mistakes cannot judged accordingly if the majority of bank managers commit them (Rajan, 2010). The institutional memory hypothesis also argues that in the long run, loan officers become less skilled or experienced to offer loans to high-risk borrowers

(Berger and Udell, 2004). The total assets (TA) of the banks are used as a proxy for bank size. Firm size is a variable that measures the presence of economies of scale in the industry and the ability to diversity portfolio risks. The factor of economies of scale could lead to a positive coefficient for profitability, while the second factor leads to a negative coefficient if increased diversification leads to lower risks and thus lower required returns, leaving the true coefficient unclear. A number of authors find a strong, negative correlation between a banks' capitalization and their profitability (Maudos and Fernández de Guevara, 2004; Carbó Valverde and Rodríguez Fernández, 2007). The authors postulate a link between capitalization and risk aversion. According to this view, banks with a high level of capital and assets are more risk averse and ignore potential diversification options or other methods to increase profitability. Maudos and Fernández de Guevara (2004) find that a 10% increase in firm size decreases profits by 0.6 percent. Their results are in line with Kasman et al. (2010) and Claeys and Vander Vennet (2008). Therefore, we define size as total assets, proxying the size of operations; the sign of the estimated coefficient is ambiguous and depends on the net effect of associated credit risk and economies of scale. LIQ is the ratio of liquid assets to customer and short-term funding, proxying the liquidity risk incurred by banks. The more the demand liabilities (i.e., customer and short-term funding) of the bank are backed up by liquid assets, the lower the liquidity risk of the banks and their profitability. In other words, a negative sign is expected.

Moreover, we control for the proportion of outside (non-executive) directors on the board (NONEXE), the separation of the Chairman/CEO positions (SEP), board size (BSIZE), the presence of an audit committee (AUD), and gender diversity (GEND). Duchin et al. (2010) and Cornelli et al. (2014) argue that the presence of outside directors to board improves the effectiveness of monitoring and, thus, reduces agency problem issues. By contrast, Adams and Ferreira (2007) and Kumar and Sivaramakrishnan (2008) present supportive evidence that if outside directors monitor CEOs too intensely, then they risk alienation, leading to losing access to key strategic information. In that case, outside directors can face a type of 'informational moral hazard, making them ineffectual monitors of board activities and to deteriorating financial performance. Pi and Timme (1993) suggest that the separation of the CEO and Chairman positions leads to a greater congruence between owners' interests and

corporate activities. By contrast, the duality between the two positions could exacerbate principal-agent incentive conflicts. The presence of audit committees helps the performance of certain important corporate governance functions, such as strengthening the independence of outside directors, and providing valuable advice on operational, auditing, financial reporting, and regulatory and fiscal issues. All these help to mitigate agency costs arising from the separation of ownership from control (Defond et al., 2005). Finally, Adams and Ferreira (2009) argue that the average effect of gender diversity on firm performance is negative. The financial performance could also be affected by the presence of certain two-way multiplicative interaction terms, i.e. that between the financial expertise and the size of the board-INTER1 (given that the overall effectiveness of financial expertise on the board could be enhanced in conjunction with the knowledge and experience of other non-financial board members-Anderson et al., 2011), and that between financial expertise and that between financial expertise and outside (non-executive) directors)-INTER2. To avoid potential multicollinearity, the component variables of the interaction terms are centered at their mean values prior to the estimation analysis (Jaccard et al., 1990).

The empirical analysis employs the methodology of the system General Method of Moments for panel data (GMM). This approach has been developed by Arellano and Bover (1995) and Blundell and Bond (1998). Bond et al. (2001) argue that this method is able to correct unobserved bank heterogeneity, omitted variable bias, measurement errors, and potential endogeneity that frequently affect estimations. The approach combines in a system the relevant regressions expressed both in first-differences and in levels. First-differencing checks for unobserved heterogeneity and omitted variable bias, as well as for time-invariant components of the measurement error. It also corrects endogeneity bias (time-varying components) via instrumenting the explanatory variables. Estimating two equations in a system GMM can reduce potential bias associated with a simple first-difference GMM estimator (Arrellano and Bover, 1995; Blundell and Bond, 1998). The consistency of the GMM estimator depends on the validity of the instruments. Moreover, two specification tests are used. First, Sargan/Hansen test of over-identifying restrictions, which tests for the overall validity of the instruments, with the null hypothesis being that all instruments as a group are exogenous. The second test examines the null hypothesis that the error term

of the differenced equation is not serially correlated, particularly, at the second order (AR2). We should not reject the null hypothesis of both tests.

However, the lack of knowledge about the properties of GMM estimators when N is small renders them a sort of a black box. Moreover, a practical problem refers to fact that the low number of cross-units may prevent the use of the full set of instruments available, implying that, in order to make estimation possible, the number of instruments must be reduced. Given the relatively small size our empirical analysis uses (i.e., 656 observations), the GMM estimations make use of the Windmeijer (2005) finite sample correction for standard errors. In addition, the asymptotic efficiency gains brought about by the additional orthogonality conditions of the system GMM estimator do not come without a cost. More specifically, the number of instruments tends to increase exponentially with the number of time periods. This proliferation of instruments leads to a finite sample bias due to the overfitting of endogenous variables and increases the likelihood of false positive results and suspiciously high pass rates of specification tests. To avoid some misspecification problems, the empirical analysis follows Roodman (2009) approach and presents findings with a collapsed instrument matrix and, thus, uses only up to two lags for the GMM estimators.

III. Data

Data for 41 UK banks (the full list is provided in Appendix A) are obtained, spanning the period 2001 to 2016. Data (based on the availability of information on the number of financial expertise on their Boards) were obtained primarily from the Bank of England, Datastream, Bankscope and various annual reports. Full details of all variables, along with their sources, included in the empirical analysis can be found in Table 1. Finally, smaller and most specialized banks, such as Tesco Personal Finance Ltd, Vanquis Bank Ltd, Southsea Mortgage & Investment Co Ltd, Marks and Spencer Financial Services Plc, Smith & Williamson Investment Management Ltd, etc. were not included. Their omission from the analysis is justified on the basis of their specialization and it should not bias the obtained results. The included banks are all classified as UK in the Bank of England's statement that: "Institutions included within the United Kingdom banking sector – nationality analysis".

[Insert Table 1 about here]

In terms of financial expertise, our analysis follows that by Guner et al. (2008) and Minton et al. (2014) where an independent director is classified as the person who i) has held an executive position at a bank, ii) holds an executive position at a non-bank financial institution, iii) holds a finance-related position (i.e., chief financial officer, accountant, treasurer, and vice-president of finance) at a non-financial firm, iv) holds an academic position in a related field, v) works as a hedge fund or equity fund manager or venture capitalist. To the end of the empirical analysis, the financial expertise variable is measured as the fraction of reported independent directors who are classified as financial experts based on the above definition. Figure 1 illustrates some graphical descriptive statistics on financial expertise. In particular, it highlights that the fraction of financial experts across independent directors increases from 21% to 25% in the period 2001-2016. Moreover, the average board size decreases very slowly, from 12.14 to 11.35 within the same period. Finally, board independence increases from 67% in 2001 to 72% in 2016, with the two figures being substantially high across the same period.

[Insert Figure 1 about here]

IV. Empirical Analysis

Financial Expertise and Bank Performance: Baseline Results-All Banks

Table 2 reports OLS fixed effects estimates. More specifically, a variety of findings is reported in Table 2, where the first three columns present the bivariate (without the control) variables across the three definitions of profitability, while the remaining three columns report the full model (including the control variables) across the same three definitions of profitability. The financial performance of banking institutions is expressed by three representative indicators: i) the (log) of the Return on Assets (ROA), ii) the (log) of the Return on Equity (ROE), and iii) the (log) of the Net Interest Margin (NIM). The first rate indicates the returns generated by the assets held by a bank and is measured as the ratio of net income to total assets, as a percentage. The second rate shows the return on shareholder funds and is measured as the ratio of net income to equity, expressed as a percentage. Finally, net interest margin is defined

as the net interest income (i.e., interest income minus interest expenses) expressed as a percentage of earning assets and reflects the profit obtained by a bank from interest-earning activities. However, before discussing the OLS estimates, we note that the p-values of the Hausman test across all six specifications clearly indicates not only the rejection of the random effects null hypothesis, but also the fact that the OLS modelling approach suffers from the presence of endogeneity, thus, rendering the results not valid. Moreover, Hermalin and Weisbach (2003) mention that the key concern of any board structure analysis is the presence of endogeneity of board structure. Therefore, given the presence of endogeneity, OLS results tend to be biased and inconsistent. Therefore, the analysis adopts an instrumental type of methodology, such that of the GMM method that explicitly considers the endogeneity bias. The GMM results are reported in Table 3.

[Insert Table 2 about here]

The exogenous instruments the analysis has employed come from two groups, the control variables in levels and the control variables in first differences, plus a constant term. More specifically, in terms of the (1) modelling specification, the instruments from the level group are: lags 2 and 3 for profitability, lags 1 and 2 for finance expertise and lags 1 and 2 for independent directors, while the instruments from the first-differenced group are: lags 2 and 43 for profitability, lag 1 for finance expertise and lag 1 for independent directors, plus a constant making that 11 instruments for specification (1). A similar approach has been chosen for the remaining specification, only in cases that more control variables are included, the number of instruments increases. The number of those instruments used is denoted in the diagnostics section of Table 3, while their validity is confirmed by the Sargan/Hansen test, also reported in the same section of the table.

The empirical findings in the first three columns document that in the overall period the percentage of independent directors is positive for bank profitability. At the same time, the percentage of financial expertise has also a positive impact on bank profitability. In the remaining three columns we have included all the above discussed control variables. In terms of our primary variable, that of financial expertise, the findings remain consistently the same across all three alternative definitions of profitability. In terms of the remaining controls, the estimations seem to be in

accordance with the majority of empirical findings in the literature, i.e. industry concentration, operation expenses management, credit risk, and equity capital ratio have all a positive effect on bank profitability, while total assets and the liquidity ratio exert a negative impact on profitability. The board size though turns out to have a negative effect on bank profitability, it is statistically insignificant. Nevertheless, that is an indication that smaller boards could actually be better suited to the complex and risky business of banking. Another notable feature gleaned from the results reported in Table 3 is the positive sign of the Audit Committee coefficient, indicating the beneficial impact of the presence of such a committee on the profitability of banking institutions. These results imply that the presence of financial experts on boards, and therefore, on audit committees, could be an essential prerequisite for effective governance and, thus, the realization of sound bank performance, i.e. profitability. Moreover, the separation of the Chair and CEO positions has a weak positive impact on bank profitability, with similar (negative) results obtained in terms of the presence of an audit committee. The presence of more females as directors seems to exert a positive effect on bank profitability. The findings in Table 4 also report the estimates for potential conjoint effects between board financial experts and board size, as well as between board financial experts and independent directors. These results also highlight that the contribution of financial experts to banks' performance is mitigated by large boards with potentially many non-financial members with conflicting strategic views. By contrast, the second interaction term turns out to be positive, suggesting that the contribution of financial experts to banks' performance is enhanced by the stronger presence of outside directors on banks' boards.

If we focus on the multivariate modelling specifications (columns 4 through 6) we could also attempt to interpret the economic significance of the estimated coefficients of the percentage of financial experts in the board. More specifically, the coefficient of 0.493 (in relevance to the ROA measure of profitability) indicates that when the proportion of financial experts' representation increases by 10 percentage points, ROA is predicted to change by about 4.93 percentage points. Given that the average bank profitability in the sample in the year 2016 was approximately 969 million pounds, a 4.93 percentage increase is translated into an increase in banks profitability by 47.77 million pounds. Similarly, for the other two estimated

coefficients for ROE (0.485) and NIM (0.502), profitability increases by 46.99 and 48.64 million pounds, respectively.

All the relevant diagnostics are reported at the bottom of Table 3. For the validity of the instruments, the results need to reject the test for second-order autocorrelation, AR(2), in the error variances. It is evident that the test for AR(2) of disturbances fails to reject the respective null. Thus, this test supports the validity of the instruments used. The table also reports the Hansen test for overidentifying restrictions. In the estimation process, instruments (per modeling specification) were generated as we used two lags for levels and three lags for difference in the regressors. As the number of instruments was by far lower than the number of observations, it did not create any identification problem, as reflected in the Hansen test. Reported Hansen test results fail to detect any problem in the validity of the instruments used in the estimation approach. Finally, the explanatory power of models, through the R-squared metrics, is highlighted to be strong enough, especially across all three multivariate modeling specifications.

[Insert Table 3 about here]

Financial Expertise and Bank Risk

Given the mixed evidence presented in the introductory section on the value of financial experts participating in the board of directors of banking institutions, this subsection explores whether the presence of such financial experts on the board is also associated with more risk taking and whether the risks taken create value for shareholders. In particular, the empirical analysis considers the concept of credit risk, defined as non-performing loans to gross loans as a direct ex-post measure of credit risk (Barth et al., 2004; González, 2005). Moreover, the determinants of credit risk are considered to be the bank size (measured by total assets value) (González, 2005; de Haan and Poghosyan, 2012), bank capitalization (Delis et al., 2011), market concentration (Alen and Gale, 2004; Beck and Demirgüç-Kunt, 2013), and GDP growth (Jimenez et al., 2008; Louzis et al., 2012). Data for the new variables are obtained from the Bankscope database over the same time span, i.e. 2001 to 2016, while more details are also provided in Table 1.

Table 3a presents GMM coefficient estimates for the underlying association. First, bank size has a negative and significant effect on credit risk, implying that banks with larger sizes can better control this type of risk. Second, bank capitalization has a significant negative effect on credit risk. Third, bank competition seems to be an important factor in reducing the exposure to credit risk. Finally, the coefficient of GDP growth is negative and has a significantly impact on credit risk. Next, focusing on our primary variables, the findings illustrate that there is a positive association between financial expertise and credit risk. These findings are consistent with financial experts acting in the interest of shareholders, as these shareholders benefit from more risk-taking. Merton (1977) has already provided empirical support to this observation on the grounds that the shareholders' cost of capital does not reflect the riskiness of their assets. In addition, this positive link is consistent with a more financially knowledgeable board having a better understanding of complex investments and potentially encouraging bank management to increase their risk taking.

[Insert Table 3a about here]

Board Characteristics and Stock Market Performance

This part of the empirical analysis explores the potential impact of financial expertise of the board on the stock performance of the banking institutions under consideration by following the model suggested by Minton et al. (2014). To this end, we are assuming a stock market performance model in which cumulated stock returns are a function of total assets, the equity-capital ratio, the beta of the stock computed as the market beta estimated from a market model in which daily stock returns are regressed on value-weighted market returns and the returns on the UK 31-day Treasury bill, total loans, real estate loans (measuring real estate exposure), mortgage-backed securities held-to-maturity, total deposits, short-term financing defined as the non-deposit short-term financing to total assets ratio, and off-balance sheet activities measured as the off balance sheet securitized assets (i.e., home equity, credit cards, auto loans, etc.) to total assets ratio. Data were obtained from Orbis database and span the same period as before. The same variables of financial expertise variables have been also included in the analysis.

The new results are reported in Table 4 and provide supportive information to those presented in table 3. In particular, the empirical findings, reported in terms of the model without the control variables, document that the percentage of independent directors exerts a positive impact on bank stock performance. At the same time, the percentage of financial expertise has also a positive effect on the same performance. In the second column, where the model includes all the relevant control variables, in terms of our primary variable, that of financial expertise, the findings remain consistently similar as those in the first column. In terms of the remaining controls, the estimations seem to be in accordance with the literature; assets, the capital equity ratio and the beta factor are positively and significantly related to stock performance across both specifications. The total deposits to assets ratio also exerts a positive effect on stock returns, while both the total loans to assets ratio and the real estate loans to assets ratio have a negative impact on stock performance. Finally, mortgage-backed securities, short-term financing and off-balance sheet activities to total assets ratios have a positive effect on stock performance.

[Insert Table 4 about here]

Financial Expertise and Bank Performance: The Effect of the 2007/2008 Crisis

To examine the role of the 2007/2008 global financial crisis for the link between banks' financial performance (profitability) and the number of financial experts in UK bank boards, the empirical analysis conducts a sensitivity test by partitioning the panel sample into two sub-periods, i.e. the period from 2001 up to 2007 (when the crisis broke out in the UK) and the period from 2008 and up to 2012 (when the crisis ended). The results are reported In Panels A and B, respectively in Table 5. In terms of our primary variable of interest, i.e. the number of financial experts on banks' boards, the new findings document the consistency of the results presented in Table 3, but this time the estimates over the crisis period are stronger versus their counterparts in the period prior to the crisis event. The number of financial experts on banks' boards exerts a stronger impact on the profitability of banking institutions, indicating that during stressful (financial) times the knowledge and experience of board members are considered a valuable asset for the course of their profitability. In both panels the remaining control variables retain their sign.

[Insert Table 5 about here]

Financial Expertise and Bank Performance: Excluding the Big Four

This part of the empirical analysis repeats the estimation procedure, but this time it excludes the so called big four banks, i.e. HSBC, Barclays, Royal Bank of Scotland, Lloyds Banking Group. Based on the significance of those four banks for the UK banking system, we can explore whether by excluding banks that differ in risk-taking policies may alter the preceding results. The reason for selecting those big four banks is that they manage over 75% of UK current accounts and 85% of business accounts. They also hold more than 5trillion pounds in total assets and employ approximately 560,000 employees (as in 2016). According to Laeven et al. (2016), the theory of the "too-big-to-fail" policies argues that because the governments are reluctant to close "big" banks in the fear of contagious bank runs and financial panic in the economy, these banks tend to take on excessive risk as they are aware of the government backup even in the worst case of failure. In addition, the "unstable banking" theory predicts that commercial banks are more likely to engage in touch-and-go activities, such as trading or leveraging their financial position using short-term debt and moving away from their traditional business of accepting deposits and making loans as they are getting bigger, which make them more susceptible to liquidity and insolvency risk (Shleifer and Vishny 2010; Bhagat et al., 2015). Finally, the "agency cost" theory supports that as the banks are growing in size and pursuing a complex of different business activities, their organizational structure would become more perplexing, which consequently exacerbates agency problem together with other governance issues (Laeven and Levine, 2007).

The analysis reruns the findings reported in Table 3 and the new results are presented in Table 6. They indicate that the percentage of financial expertise on banks' boards continues to exert a positive effect on banks' profitability, but this time the impact is weaker. These findings could probably indicate that this expertise seems to be significantly less important for smaller banks that do not tend to undertake high risks, since it will be much more difficult for them to cope with it, especially in stressful times. Once again, the remaining drivers retain their theoretical significance, albeit at weaker levels.

[Insert Table 6 about here]

Financial Expertise and Bank Performance: The Role of the Profession

This strand of the robustness test explicitly considers the effect of three specific categories of financial expertise, i.e. financial and banking professors, professionally qualified accountants, and financial experts from other industries, on the same number of measures of banking industry profitability considered before, i.e. return on assets, return on equity, and net profit margin.

Table 7 provides the results for each of the three types of financial experts defined above. They document that board-level financial and banking professor, as well as financial experts from other industries play a positive role in terms of the banks' profitability. These findings remain consistently similar across all three definitions of profitability. By contrast, professionally qualified accountants are not significantly related to bank profitability. Moreover, the findings provide evidence that the three interaction terms of financial experts with the three types of professionals are positive, implying that the contribution of financial experts to profitability could be enhanced by the liaisons between different board-level financial experts, i.e. the synergies developed by those professions could have tangible clear benefits for the profitability of banking institutions.

[Insert Table 7 about here]

Financial Expertise, Bank Performance and Credit Risk: The Case of the Large Banks

Given that our sample includes deposit-taking institutions, many of which are small, the policy implications could be less clear-cut if the results are driven just by small banks only. After all, large banks have been at the center of the 2008 global financial crisis, since their distress has caused serious damage to the real economy. This has triggered a heated debate on the optimal size and the organizational complexity of banks (Viñals et al., 2013). Large banks usually generate more individual and systemic risk than smaller banks, especially when they have insufficient capital or unstable funding, which are very common features of large banks. Additionally, large banks generate more systemic risk when they engage more in market-based activities or are more organizationally complex. The presence of more finance expertise in the boards of such large banks will enhance the impact on credit risk since those financial

experts can easier convince the management of those banks to undertake riskier activities, leading them probably to higher profitability. If this is the case, the implications are expected to be very novel and crucial: the higher systemic risk implies that risky activities may be insufficiently addressed by micro-prudential regulation, which focuses only on individual bank risk, while targeting bank activities and complexity may need to be undertaken in the context of a wider macro-prudential framework. Accordingly, to reduce the systemic risk in large banks, policies need to take into consideration the disproportional role of large banks (Philippon, 2010; Arcand et al., 2012).

Therefore, this part of the empirical analysis does some subsample analysis to demonstrate whether the findings can be held for larger banks as well (this point has been raised by a referee). To this end, we repeat the above analysis by including the four large banks we had excluded in a previous step of the analysis. Tables 8 and 9 report the results on the impact of finance expertise on boards on bank profitability and credit risk, respectively. The findings in Table 8 clearly indicate that across all specifications, financial expertise among board members in large banks though it remains positive in association with bank profitability, the impact is weaker with respect to that for smaller banks, indicating the consistency of the argument that large banks with more financial expertise on their board are associated with lower profitability probably leading up to financial crises. This could be attributed to the fact that the asset quality (i.e., a higher proportion of non-performing loans) of those banks has significantly deteriorated (Bernanke et al., 1991; Pasiouras and Kosmidou, 2007; Klein, 2013).

As Table 9 reports, in the sample of large banks the impact of finance expertise on their boards on credit risk is stronger. The coefficient estimates across all modelling specifications are larger and more statistically significant than they are for the sample of smaller banks (Table 6). This positive and stronger association could be attributed to the interpretation provided above, according to which financial experts may easier influence and/or sanction the decision making of senior bank management in the case of larger banks, since these banks tend to attract the most exquisite professional and academics in the business, thus, putting more faith to their suggestions in undertaking riskier banking activities (Shi et al., 2017). These findings come in contrast to the arguments presented in the literature that large banks are more

effective in controlling problem loans, because they have advanced technologies and skilled manpower to tactfully handle moral hazard and agency problems (Rajan and Dhal 2003), or because large banks are more capable of collecting ample relevant information related to borrowers, enabling them to take correct lending decisions. What our findings indicate is that large banks may have seriously considered advise from financial experts on their board and have expanded their activities in risky sectors to achieve monopoly profit, an action that increases the proportion of bad loans and cause market failures (Gennaioli et al., 2013).

[Insert Tables 8 and 9 about here]

Financial Expertise and Bank Performance: Evidence by the Type of Banks

The UK institutions the empirical analysis has considered in the sample are quite heterogeneous. This type of heterogeneity is primarily attributed to differences in business models of these institutions, implying that the need for and effects of financial expertise could differ by type of institution. The sample includes commercial banks, mortgage banks, investment banks, and others (general financial services, financial services to charities, trade unions, special business and other organizations). There were cases in which a bank was involved in more than one type of activities; therefore, our classification is based on the major proportion the bank's loan activities focuses on, e.g. commercial/retailing, investment, financial services, mortgage, and other. Hence, based on a referee's comments, this part of the analysis re-examines the impact of financial expertise on the boards of directors on banks' financial performance by differentiating the type of the banking institution. The banks that belong in each type of services provided are presented in Appendix B.

The new findings, with respect to the ROA definition of profitability, are presented in Table 10 (the empirical findings with respect to the other two definitions generated similar results and they are not reported here). The decomposed findings clearly illustrate that the effect of financial expertise in the board of directors on bank profitability remains positive in the cases of commercial, investment and other types of banks. Surprisingly, financial expertise exerts a negative impact on profitability in the case of mortgage banks, probably indicating that financial experts have largely contributed to real estate exposures of those bank institutions, a fact that deserves further research in future venues.

[Insert Table 10 about here]

V. Conclusion

Using panel data, spanning the period 2001 to 2016 from the UK banking industry (41 UK banks), this study examined the pooled impact on three profitability indicators of the presence of financial experts on banking boards of directors, as well as the role of three professional types of those financial experts, i.e. financial and banking professors, qualified professional accountants and financial experts from other industries. The results provided evidence that overall financial experts have a beneficial impact on the profitability of UK banks. Furthermore, the evidence demonstrated that board-level qualified accountants were not statistically linked with profitability across all three definitions. By contrast, the other two professional groups are significantly associated with sound profitability measures. These results imply that the group of professional accountants may not be as adept at group-level profitability enhancement as financial and banking professors, as well as financial experts from other industries. This insight could usefully inform banking regulators and shape future corporate governance guidelines for the banking industry. The findings indicate that board-level financial expertise may be of high importance for realizing sound and sustainable corporate performance.

Moreover, the analysis investigated the role of the financial expertise factor in banks credit risk. The results provided evidence of a positive link between these two variables. Such findings seem to challenge the regulators' view that more financial expertise on the boards of banks would unambiguously lower their risk profile. In that sense, financial experts are more willing to let their bank participate in more risk-taking activities because they tend to believe that their familiarity and understanding of complex financial instruments could assist them in coping with stressful financial and economic environments. However, this turns out not to be the case with respect to the UK banks. Finally, the decomposition of banks per type of activity provided robust support to the results across all types of banks, except those in the real estate business.

The empirical analysis provides results which could stimulate further research venues on the role of board-level financial experts on financial decisions in banking. Moreover, given that the notion of risk taking by banks is an important key for

understanding the link between performance and board composition, if more financially-knowledgeable board members are better in assessing certain risks, then they might be able to advise the (senior) bank management to avoid certain risks, while alternatively, they might recognize risks that are worth undertaking and which would benefit the shareholders.

APPENDIX A. Full list of 41 UK banks

HSBC Bank Plc, Barclays Bank Plc, The Royal Bank of Scotland Plc, Lloyds Bank Plc, Arbuthnot Latham & Co Limited, Bradford & Bingley Plc, Consolidated Credits Bank Limited, Ruffler Bank Plc, Schroder & Co Ltd, Standard Chartered Bank, Standard Life Bank, Abbey National Treasury Services Plc, Adam & Company Plc, AIB Group (UK) Plc, Aldermore Bank Plc, Atom Bank PLC, Bank and Clients PLC, Bank of Scotland Plc, CIBC World Markets Plc, Close Brothers Limited, Clydesdale Bank Plc, The Co-operative Bank Plc, Diamond Bank (UK) Plc, FCE Bank Plc, Gatehouse Bank Plc, Hampden & Co Plc, Hampshire Trust Bank Plc, ICBC Standard Bank Plc, Investec Bank PLC, Metro Bank PLC, National Westminster Bank Plc, OneSavings Bank Plc, Sainsbury's Bank Plc, Secure Trust Bank Plc, Tesco Personal Finance Plc, TSB Bank Plc, Union Bank (UK) Plc, Unity Trust Bank Plc, Virgin Money Plc, VTB Capital Plc, Wyelands Bank Plc) [Source: https://www.bankofengland.co.uk/prudential-regulation/authorisations/which-firms-does-the-pra-regulate]. (41)

APPENDIX B. Banks classification by type of services

Commercial banks: HSBC Bank Plc, The Royal Bank of Scotland Plc, Lloyds Bank Plc, Arbuthnot Latham & Co Limited, Consolidated Credits Bank Limited, Ruffler Bank Plc, Standard Life Bank, Adam & Company Plc, AIB Group (UK) Plc, Aldermore Bank Plc, Atom Bank PLC, Bank and Clients PLC, Bank of Scotland Plc, Clydesdale Bank Plc, The Co-operative Bank Plc, FCE Bank Plc, Hampden & Co Plc, ICBC Standard Bank Plc, Metro Bank PLC, National Westminster Bank Plc, Sainsbury's Bank Plc, Secure Trust Bank Plc, TSB Bank Plc, Virgin Money Plc, Wyelands Bank Plc. (25)

Mortgage banks: Bradford & Bingley Plc, Abbey National Treasury Services Plc, Gatehouse Bank Plc, OneSavings Bank Plc. (4)

Investment banks: Barclays Bank Plc, Schroder & Co Ltd, Standard Chartered Bank, CIBC World Markets Plc, Close Brothers Limited, Diamond Bank (UK) Plc, Investec Bank PLC, VTB Capital Plc. (8)

Other banks (Financial services to charities, trade unions, special business and other organizations): Tesco Personal Finance Plc, Unity Trust Bank Plc, Hampshire Trust Bank Plc, Union Bank (UK) Plc. (4)

TABLE 1. Variables Definition.

The table provides the definition of all variables included in the empirical analysis, along with the source of evidence for those variables.

Variables	Source
Financial experts: % financial experts across independent directors	Annual reports
Independent directors: % independent directors	Annual reports
Returns on assets	Datastream
Returns on equity	Datastream
Net interest margin: interest income minus interest expenses divided by total assets	Datastream
Industry concentration: Herfindahl index-the sum of the squares of the	

market shares of the banks within the industry	Bankscope/Orbis
Operation expenses management: All expenses relating to the ordinary and regular banking business, particularly salaries and other employee benefits, including transfers to pension reserves (staff costs), and expenses for property and equipment and related depreciation expenses. Taxes other than income or corporate taxes are also included	Bankscope/Orbis
Credit risk: NPLs/Total loans	Bankscope/Orbis
Total assets	Datastream
Equity capital ratio: total book equity divided by total assets	Datastream
Liquidity ratio: the ratio of cash, government-issued and government-guaranteed securities and interbank deposits to bank’s total assets	Datastream
Chair/CEO position: A dummy variable which takes 1 if the Chair holds a CEO position, and 0 otherwise	Annual reports

Board size: the total number of Board members	Annual reports
Audit committee: a dummy variable which takes 1 if the bank has such a committee, and 0 otherwise	Annual reports
Gender: A dummy variable which takes 1 for males and 0 for females board members	Annual reports
Non-performing loans to gross loans	Bankscope
Bank capitalization	Bankscope
Real GDP (at constant 2005 prices)	Datastream

TABLE 2. OLS Results: Board of Directors Financial Expertise and Bank Profitability-All Banks.

This table reports OLS fixed effects coefficients from predicting bank profitability proxied by three alternative definitions, i.e. return on assets, return on equity and net interest margins. The estimates include all 41 banks under consideration. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to six alternative model specifications. The first three columns present the bivariate (without the control) variables across the three definitions of profitability, while the remaining three columns report the full model (including the control variables) across the same three definitions of profitability. Figures in brackets denote p-values, while ***:p≤0.01, **: p≤0.05, *:p≤0.10.

Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Profitability (-1)	0.624***	0.632***	0.645***	0.586***	0.564***	0.570***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Financial expertise	0.386***	0.336***	0.389***	0.327***	0.295***	0.318***
	[0.00]	[0.01]	[0.00]	[0.00]	[0.01]	[0.00]
Independent directors	0.149**	0.125*	0.152**	0.118*	0.112*	0.128**
	[0.05]	[0.06]	[0.03]	[0.06]	[0.06]	[0.05]
Industry concentration				0.089*	0.081*	0.096*
				[0.09]	[0.09]	[0.08]
Operating expenses management				0.102**	0.087*	0.109**

				[0.05]	[0.10]	[0.05]
Credit risk				0.052*	0.038*	0.059*
				[0.06]	[0.08]	[0.06]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Total assets				-0.693***	-0.668***	-0.705***
				[0.00]	[0.00]	[0.00]
Equity capital ratio				0.259***	0.235***	0.268***
				[0.01]	[0.01]	[0.00]
Liquidity ratio				-0.173**	-0.148**	-0.186***
				[0.02]	[0.03]	[0.01]
Chair/CEO position				0.048*	0.035	0.055*
				[0.08]	[0.15]	[0.07]
Board size				-0.008	-0.003	-0.012
				[0.23]	[0.29]	[0.22]
Audit Committee				0.027*	0.020	0.032*

				[0.10]	[0.14]	[0.09]
Gender				0.037**	0.031*	0.040**
				[0.05]	[0.07]	[0.05]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Financial expertise x board size				-0.024**	-0.017*	-0.029**
				[0.05]	[0.06]	[0.05]
Financial expertise x independent directors				0.030**	0.022**	0.036**
				[0.04]	[0.05]	[0.05]
Constant	1.136**	1.208**	1.175**	0.894*	0.932*	0.852*
	[0.04]	[0.03]	[0.04]	[0.07]	[0.06]	[0.07]
Diagnostics						
R-squared adjusted	0.33	0.30	0.35	0.67	0.62	0.69
Hausman test	[0.05]	[0.05]	[0.03]	[0.01]	[0.01]	[0.00]
Number of observations	656	656	656	656	656	656

TABLE 3. GMM Results: Board of Directors Financial Expertise and Bank Profitability-All Banks.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting bank profitability proxied by three alternative definitions, i.e. return on assets, return on equity and net interest margins. The estimates include all 41 banks under consideration. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to six alternative model specifications. The first three columns present the model without the control variables across the three definitions of profitability, while the remaining three columns report the full model (including the control variables) across the same three definitions of profitability. Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05, *:p≤0.10.

Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Profitability (-1)	0.679***	0.655***	0.696***	0.638***	0.609***	0.651***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Financial expertise	0.524***	0.502***	0.548***	0.493***	0.485***	0.502***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Independent directors	0.237**	0.214**	0.252**	0.216**	0.197**	0.239**
	[0.03]	[0.04]	[0.03]	[0.05]	[0.05]	[0.04]
Industry concentration				0.114*	0.093*	0.126*

				[0.08]	[0.10]	[0.08]
Operating expenses management				0.136**	0.112*	0.150**
				[0.04]	[0.08]	[0.04]
Credit risk				0.067**	0.051*	0.072**
				[0.05]	[0.08]	[0.05]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Total assets				-0.759***	-0.737***	-0.775***
				[0.00]	[0.00]	[0.00]
Equity capital ratio				0.311***	0.296***	0.330***
				[0.00]	[0.00]	[0.00]
Liquidity ratio				-0.209***	-0.183**	-0.219***
				[0.01]	[0.03]	[0.00]
Chair/CEO position				0.061*	0.038	0.069**
				[0.06]	[0.12]	[0.02]
Board size				-0.012	-0.005	-0.016

				[0.18]	[0.24]	[0.14]
Audit Committee				0.032*	0.024	0.038*
				[0.08]	[0.11]	[0.07]
Gender				0.042**	0.034*	0.049**
				[0.05]	[0.06]	[0.04]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Financial expertise x board size				-0.028**	-0.023**	-0.041***
				[0.03]	[0.04]	[0.01]
Financial expertise x independent directors				0.035**	0.028**	0.048***
				[0.03]	[0.05]	[0.01]
Constant	1.068**	1.144**	1.089**	0.836*	0.891*	0.826*
	[0.05]	[0.03]	[0.04]	[0.08]	[0.07]	[0.08]
Diagnostics						
R-squared adjusted	0.46	0.41	0.49	0.85	0.80	0.87
No. of instruments	11	12	13	26	24	27

AR(2)	[0.38]	[0.32]	[0.41]	[0.46]	[0.40]	[0.52]
Sargan/Hansen test	[0.57]	[0.53]	[0.62]	[0.60]	[0.55]	[0.69]
Number of observations	656	656	656	656	656	656

TABLE 3a. GMM Results: Board of Directors Financial Expertise and Credit Risk-All Banks.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting the credit risk, defined as non-performing loans to gross loans as a direct ex-post measure of credit risk. The estimates include all 41 banks under consideration. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to two alternative model specifications. The first column presents the bivariate (without the control) variables, while the second column reports the full model (including the control variables). Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05.

Variables	(1)	(2)
Financial expertise	0.146***	0.129***
	[0.00]	[0.00]
Independent directors	0.049**	0.043**
	[0.04]	[0.05]
Industry concentration		0.075**
		[0.03]
Bank size (Total assets)		-0.696***
		[0.00]
Capitalization		-0.058***
		[0.00]
GDP growth		-0.058***
		[0.01]
Board size		0.027**
		[0.05]
Audit Committee		-0.061***
		[0.01]
Constant	0.994**	0.846*
	[0.05]	[0.07]

Diagnostics		
R-squared adjusted	0.42	0.79
No. of instruments	9	23
AR(2)	[0.34]	[0.53]
Sargan/Hansen test	[0.49]	[0.55]
Number of observations	656	656

TABLE 4. GMM Results: Board of Directors Financial Expertise and Bank Stock Performance-All Banks.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting bank stock performance. The estimates include all 41 banks under consideration. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to two alternative model specifications. The first column presents the model without the control variables, while the second column reports the full model (including the control variables). Returns are measured as cumulative bank stock returns. Log(assets) is the natural logarithm of total book assets, the equity capital ratio is defined as total book equity divided by total assets, the beta risk factor is computed as the market beta estimated from a market model in which daily stock returns are explained by value-weighted market returns and the returns on the 31-day UK Treasury bill. Mortgage-backed securities are defined as held-to-maturity securities, available-for-sale and held for trading relative to total assets, short-term financing is defined as the non-deposit short-term financing to total asset ratio, while off-balance sheet activities are measured as the off-balance sheet securitized assets (i.e., home equity, credit card, auto loans, etc.) to total assets ratio. Data are from the Orbis database. Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05, *:p≤0.10.

Variables	(1)	(2)
Returns (-1)	0.514***	0.486***
	[0.00]	[0.00]
Financial expertise	0.274***	0.239***
	[0.00]	[0.00]
Independent directors	0.176**	0.138**
	[0.02]	[0.03]
Assets		0.153**
		[0.04]
Equity capital ratio		0.197***
		[0.00]
Beta		0.198***
		[0.01]
Total loans to assets ratio		-0.176**

		[0.05]
Total deposits to assets ratio		0.385***
		[0.00]
Real estate to total assets ratio		-0.475***
		[0.00]
Mortgage backed securities		0.264*
		[0.07]
Short-term financing to assets ratio		0.197*
		[0.10]
Off-balance sheet items to assets ratio		0.139
		[0.14]
Board size		0.009
		[0.29]
Audit Committee		0.058**
		[0.05]
Gender		0.026
		[0.17]
Financial expertise x board size		-0.042**
		[0.02]
Financial expertise x independent directors		0.058**
		[0.02]
Constant	1.176**	0.762*
	[0.04]	[0.07]
Diagnostics		
R-squared adjusted	0.29	0.68
No. of instruments	17	31
AR(2)	[0.32]	[0.51]
Sargan/Hansen test	[0.44]	[0.58]
Number of observations	656	656

TABLE 5. GMM Results: Board of Directors Financial Expertise and Bank Profitability-All Banks-The Role of the 2007/08 Crisis.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting bank profitability proxied by three alternative definitions, i.e. return on assets, return on equity and net interest margins. The estimates include all 41 banks and are based on a sensitivity analysis which partitions the panel sample into two sub-periods, i.e. the period from 2001 up to 2007 (when the crisis broke out in the UK)-Panel A and the period from 2008 and up to 2012 (when the crisis ended)-Panel B. The estimates include all 41 banks under consideration. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to six alternative model specifications. The first three columns present the bivariate (without the control) variables across the three definitions of profitability, while the remaining three columns report the full model (including the control variables) across the same three definitions of profitability. Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05, *:p≤0.10.

Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: 2001-2007						
Profitability (-1)	0.613***	0.602***	0.648***	0.604***	0.583***	0.637***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Financial expertise	0.473***	0.449***	0.496***	0.452***	0.427***	0.475***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]

Independent directors	0.206**	0.186**	0.228**	0.201**	0.166*	0.221**
	[0.04]	[0.05]	[0.03]	[0.04]	[0.07]	[0.03]
Industry concentration				0.112*	0.097*	0.122*
				[0.08]	[0.10]	[0.07]
Operating expenses management				0.139**	0.116*	0.159**
				[0.04]	[0.08]	[0.03]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Credit risk				0.048*	0.042*	0.061**
				[0.06]	[0.09]	[0.05]
Total assets				-0.721***	-0.709***	-0.744***
				[0.00]	[0.00]	[0.00]
Equity capital ratio				0.302***	0.282***	0.313***
				[0.00]	[0.00]	[0.00]
Liquidity ratio				-0.201***	-0.174**	-0.214***

				[0.01]	[0.03]	[0.00]
Chair/CEO position				0.050*	0.033	0.064**
				[0.07]	[0.15]	[0.04]
Board size				-0.008	-0.003	-0.012
				[0.26]	[0.30]	[0.18]
Audit Committee				0.024*	0.016	0.031*
				[0.09]	[0.19]	[0.08]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Gender				0.039**	0.032*	0.045**
				[0.05]	[0.07]	[0.04]
Financial expertise x board size				-0.017*	-0.011*	-0.022**
				[0.06]	[0.09]	[0.05]
Financial expertise x independent directors				0.030**	0.024*	0.036**
				[0.04]	[0.06]	[0.05]
Constant	1.074**	1.185**	1.139**	0.775*	0.796*	0.741*

	[0.03]	[0.02]	[0.03]	[0.09]	[0.08]	[0.10]
Diagnostics						
R-squared adjusted	0.41	0.38	0.44	0.81	0.75	0.83
No. of instruments	9	10	12	25	25	26
AR(2)	[0.33]	[0.35]	[0.40]	[0.42]	[0.43]	[0.55]
Sargan/Hansen test	[0.54]	[0.50]	[0.57]	[0.64]	[0.51]	[0.74]
Number of observations	328	328	328	328	328	328
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: 2007-2012						
Profitability (-1)	0.698***	0.665***	0.714***	0.649***	0.623***	0.677***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Financial expertise	0.536***	0.520***	0.568***	0.507***	0.498***	0.526***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Independent directors	0.244**	0.221**	0.270***	0.224**	0.206**	0.252**
	[0.02]	[0.03]	[0.01]	[0.04]	[0.04]	[0.02]

Industry concentration				0.118*	0.091*	0.121*
				[0.07]	[0.10]	[0.08]
Operating expenses management				0.132**	0.109*	0.144**
				[0.04]	[0.08]	[0.04]
Credit risk				0.064**	0.047*	0.068**
				[0.05]	[0.08]	[0.05]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Total assets				-0.772***	-0.746***	-0.789***
				[0.00]	[0.00]	[0.00]
Equity capital ratio				0.324***	0.305***	0.343***
				[0.00]	[0.00]	[0.00]
Liquidity ratio				-0.216***	-0.199**	-0.235***
				[0.01]	[0.03]	[0.00]
Chair/CEO position				0.068**	0.040	0.080***

				[0.05]	[0.11]	[0.01]
Board size				-0.018	-0.010	-0.024
				[0.14]	[0.20]	[0.11]
Audit Committee				0.039*	0.030*	0.046**
				[0.06]	[0.10]	[0.05]
Gender				0.040**	0.033*	0.046**
				[0.05]	[0.06]	[0.03]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Financial expertise x board size				-0.033**	-0.026**	-0.049***
				[0.02]	[0.04]	[0.01]
Financial expertise x independent directors				0.040**	0.033**	0.059***
				[0.02]	[0.04]	[0.01]
Constant	1.209***	1.194***	1.195***	0.928**	0.896**	0.937**
	[0.01]	[0.01]	[0.01]	[0.03]	[0.03]	[0.02]
Diagnostics						

R-squared adjusted	0.47	0.43	0.50	0.87	0.83	0.89
No. of instruments	12	10	11	23	21	24
AR(2)	[0.40]	[0.35]	[0.40]	[0.49]	[0.37]	[0.56]
Sargan/Hansen test	[0.52]	[0.56]	[0.60]	[0.57]	[0.51]	[0.65]
Number of observations	328	328	328	328	328	328

TABLE 6. GMM Results: Board of Directors Financial Expertise and Bank Profitability-Excluding the Big Four Banks.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting bank profitability proxied by three alternative definitions, i.e. return on assets, return on equity and net interest margins. The estimates include 37 banks by excluding the so called big four banks, i.e. HSBC, Barclays, Royal Bank of Scotland, and Lloyds Banking Group. Based on the significance of those four banks for the UK banking system, the estimates try to highlight whether by excluding banks that differ in risk-taking policies may alter the preceding results. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to six alternative model specifications. The first three columns present the bivariate (without the control) variables across the three definitions of profitability, while the remaining three columns report the full model (including the control variables) across the same three definitions of profitability. Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05, *:p≤0.10.

Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Profitability (-1)	0.658***	0.646***	0.678***	0.629***	0.601***	0.644***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Financial expertise	0.481***	0.466***	0.524***	0.475***	0.459***	0.490***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Independent directors	0.219**	0.202**	0.239**	0.207**	0.184**	0.221**

	[0.04]	[0.05]	[0.03]	[0.05]	[0.05]	[0.03]
Industry concentration				0.109*	0.085*	0.115*
				[0.08]	[0.10]	[0.07]
Operating expenses management				0.133**	0.106*	0.145**
				[0.04]	[0.09]	[0.03]
Credit risk				0.062**	0.044*	0.070**
				[0.05]	[0.09]	[0.05]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Total assets				0.744***	0.731***	0.763***
				[0.00]	[0.00]	[0.00]
Equity capital ratio				0.302***	0.287***	0.323***
				[0.00]	[0.00]	[0.00]
Liquidity ratio				-0.202***	-0.175**	-0.212***
				[0.01]	[0.04]	[0.00]
Chair/CEO position				0.055*	0.032	0.061**

				[0.07]	[0.14]	[0.03]
Board size				-0.010	-0.004	-0.012
				[0.20]	[0.25]	[0.17]
Audit Committee				0.029*	0.021	0.032*
				[0.09]	[0.14]	[0.08]
Gender				0.040**	0.033*	0.045**
				[0.05]	[0.06]	[0.05]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Financial expertise x board size				-0.025**	-0.020**	-0.036**
				[0.04]	[0.05]	[0.02]
Financial expertise x independent directors				0.032**	0.025**	0.043***
				[0.04]	[0.05]	[0.01]
Constant	1.018**	1.064**	1.008**	0.829*	0.865**	0.814*
	[0.04]	[0.03]	[0.05]	[0.06]	[0.05]	[0.07]
Diagnostics						

R-squared adjusted	0.40	0.37	0.44	0.82	0.77	0.83
No. of instruments	12	12	14	24	25	27
AR(2)	[0.32]	[0.29]	[0.36]	[0.41]	[0.37]	[0.48]
Sargan/Hansen test	[0.53]	[0.51]	[0.57]	[0.52]	[0.51]	[0.62]
Number of observations	592	592	592	592	592	592

TABLE 7. GMM Results: Board of Directors Financial Expertise and Bank Profitability-All Banks-the Role of the Profession.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting bank profitability proxied by three alternative definitions, i.e. return on assets, return on equity and net interest margins. The estimates include all 41 banks. Financial experts have been explicitly classified into three specific categories, i.e. financial and banking professors, professionally qualified accountants, and financial experts from other industries. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to six alternative model specifications. The first three columns present the bivariate (without the control) variables across the three definitions of profitability, while the remaining three columns report the full model (including the control variables) across the same three definitions of profitability. Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05, *:p≤0.10.

Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Profitability (-1)	0.584***	0.549***	0.597***	0.553***	0.536***	0.573***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Independent directors	0.216**	0.205**	0.230**	0.211**	0.199**	0.228**
	[0.03]	[0.04]	[0.03]	[0.04]	[0.05]	[0.04]
Financial and banking professors	0.274***	0.252***	0.289***	0.261***	0.250***	0.283***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.00]

Professional qualified accountants	0.083	0.062	0.085	0.064	0.049	0.068
	[0.14]	[0.18]	[0.14]	[0.19]	[0.24]	[0.18]
Financial experts from other industries	0.196**	0.178**	0.219***	0.184**	0.162**	0.201***
	[0.02]	[0.03]	[0.01]	[0.02]	[0.03]	[0.01]
Industry concentration				0.102*	0.085*	0.119*
				[0.09]	[0.10]	[0.08]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Operating expenses management				0.125**	0.107*	0.138**
				[0.05]	[0.07]	[0.04]
Credit risk				0.055**	0.047*	0.064**
				[0.05]	[0.06]	[0.04]
Total assets				-0.714***	-0.686***	-0.731***
				[0.00]	[0.00]	[0.00]
Equity capital ratio				0.289***	0.267***	0.305***
				[0.00]	[0.00]	[0.00]

Liquidity ratio				-0.185***	-0.169**	-0.204***
				[0.01]	[0.02]	[0.00]
Chair/CEO position				0.055*	0.032	0.067**
				[0.07]	[0.16]	[0.05]
Board size				-0.009	-0.004	-0.013
				[0.23]	[0.29]	[0.21]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Audit Committee				0.029*	0.025*	0.034*
				[0.09]	[0.10]	[0.08]
Gender				0.038**	0.032*	0.047**
				[0.05]	[0.06]	[0.04]
Financial expertise x financial and banking professors				0.069**	0.061**	0.082***
				[0.02]	[0.02]	[0.01]
Financial expertise x professional qualified						

accountants				0.018	0.013	0.023
				[0.35]	[0.39]	[0.32]
Financial expertise x financial experts from other industries				0.058**	0.052**	0.071***
				[0.02]	[0.03]	[0.01]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.028**	1.074**	1.033**	0.811*	0.773*	0.803*
	[0.03]	[0.02]	[0.03]	[0.07]	[0.08]	[0.07]
Diagnostics						
R-squared adjusted	0.52	0.47	0.55	0.83	0.79	0.88
No. of instruments	12	14	14	29	26	28
AR(2)	[0.34]	[0.37]	[0.39]	[0.49]	[0.45]	[0.56]
Sargan/Hansen test	[0.52]	[0.51]	[0.60]	[0.63]	[0.59]	[0.66]
Number of observations	64	64	64	64	64	64

TABLE 8. GMM Results: Board of Directors Financial Expertise and Bank Profitability-the Big Four Banks.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting bank profitability proxied by three alternative definitions, i.e. return on assets, return on equity and net interest margins. The estimates include only 4 banks, the so called big four banks, i.e. HSBC, Barclays, Royal Bank of Scotland, and Lloyds Banking Group. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to six alternative model specifications. The first three columns present the bivariate (without the control) variables across the three definitions of profitability, while the remaining three columns report the full model (including the control variables) across the same three definitions of profitability. Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05, *:p≤0.10.

Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Profitability (-1)	0.687***	0.661***	0.715***	0.642***	0.626***	0.679***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Financial expertise	0.418***	0.403***	0.473***	0.401***	0.384***	0.439***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Independent directors	0.201**	0.187**	0.214**	0.192**	0.177**	0.184**
	[0.05]	[0.05]	[0.04]	[0.05]	[0.05]	[0.05]

Industry concentration				0.137*	0.102*	0.141*
				[0.06]	[0.07]	[0.06]
Operating expenses management				0.182**	0.138**	0.196**
				[0.02]	[0.05]	[0.02]
Credit risk				0.107**	0.092**	0.129**
				[0.03]	[0.04]	[0.02]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Total assets				-0.816***	-0.796***	-0.837***
				[0.00]	[0.00]	[0.00]
Equity capital ratio				0.331***	0.305***	0.359***
				[0.00]	[0.00]	[0.00]
Liquidity ratio				-0.228***	-0.196**	-0.247***
				[0.00]	[0.01]	[0.00]
Chair/CEO position				0.064*	0.040*	0.077**
				[0.06]	[0.09]	[0.03]

Board size				-0.023	-0.011	-0.035
				[0.18]	[0.22]	[0.14]
Audit Committee				0.042*	0.030*	0.049**
				[0.06]	[0.10]	[0.05]
Gender				0.046**	0.039**	0.054**
				[0.04]	[0.05]	[0.03]
Variables	ROA	ROE	NIM	ROA	ROE	NIM
	(1)	(2)	(3)	(4)	(5)	(6)
Financial expertise x board size				-0.032**	-0.028**	-0.041**
				[0.03]	[0.04]	[0.02]
Financial expertise x independent directors				0.039**	0.031**	0.048***
				[0.03]	[0.04]	[0.01]
Constant	1.074**	1.042**	1.109**	0.813*	0.785*	0.829*
	[0.03]	[0.04]	[0.02]	[0.07]	[0.06]	[0.07]
Diagnostics						
R-squared adjusted	0.47	0.42	0.52	0.85	0.80	0.87

No. of instruments	11	12	14	25	26	27
AR(2)	[0.36]	[0.32]	[0.39]	[0.46]	[0.38]	[0.46]
Sargan/Hansen test	[0.55]	[0.52]	[0.60]	[0.55]	[0.53]	[0.64]
Number of observations	592	592	592	592	592	592

TABLE 9. GMM Results: Board of Directors Financial Expertise and Credit Risk-The Four Large Banks.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting the credit risk of banks. The estimates include only 4 banks, the so called big four banks, i.e. HSBC, Barclays, Royal Bank of Scotland, and Lloyds Banking Group. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to two alternative model specifications. The first column presents the bivariate (without the control) variables, while the second column reports the full model (including the control variables). Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05.

Variables	(1)	(2)
Financial expertise	0.204***	0.185***
	[0.00]	[0.00]
Independent directors	0.076**	0.068**
	[0.02]	[0.02]
Industry concentration		0.096***
		[0.01]
Bank size (Total assets)		-0.774***
		[0.00]
Capitalization		-0.102***
		[0.00]
GDP growth		-0.092***
		[0.00]
Board size		0.046**
		[0.03]
Audit Committee		-0.092***
		[0.00]
Constant	0.894*	0.749*
	[0.07]	[0.08]

Diagnostics		
R-squared adjusted	0.48	0.86
No. of instruments	11	26
AR(2)	[0.39]	[0.60]
Sargan/Hansen test	[0.53]	[0.59]
Number of observations	656	656

TABLE 10. GMM Results: Board of Directors Financial Expertise and Bank Profitability-Types of Banks and ROA.

This table reports General Method of Moments (GMM) fixed effects coefficients from predicting bank profitability proxied as return on assets. The estimates include all 41 banks. The estimates are in relevance to the type of bank included in the analysis. In particular, the sample includes commercial banks, mortgage banks, investment banks, and others (general financial services, financial services to charities, trade unions, special business and other organizations). In cases where a bank was involved in more than one type of activities, the classification was based on the major proportion the bank's loan activities focuses on, e.g. commercial/retailing, investment, financial services, mortgage, and other. Statistics are based on annual data, spanning the period 2001- 2016. The estimates are in relevance to six alternative model specifications. The first three columns present the bivariate (without the control) variables across the three definitions of profitability, while the remaining three columns report the full model (including the control variables) across the same three definitions of profitability. Figures in brackets denote p-values. AR2 is the test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Sargan/Hansen is the test of the over-identifying restrictions, asymptotically distributed as χ^2, under the null of instruments' validity. ***:p≤0.01, **: p≤0.05, *:p≤0.10.

Variables	Commercial	Mortgage	Investment	Other
Profitability (-1)	0.714***	0.618***	0.674***	0.562***
	[0.00]	[0.00]	[0.00]	[0.00]
Financial expertise	0.476***	-0.294***	0.585***	226***
	[0.00]	[0.00]	[0.00]	[0.00]
Independent directors	0.203**	-0.142**	0.264**	0.177**
	[0.05]	[0.05]	[0.03]	[0.05]
Industry concentration	0.078*	0.096*	0.168**	0.082*

	[0.10]	[0.08]	[0.04]	[0.09]
Operating expenses management	0.169**	0.124*	0.197***	0.106*
	[0.03]	[0.07]	[0.01]	[0.09]
Credit risk	0.044**	0.078**	0.116***	0.049**
	[0.05]	[0.03]	[0.01]	[0.05]

Variables	Commercial	Mortgage	Investment	Other
Total assets	-0.694***	-0.708***	-0.796***	-0.662***
	[0.00]	[0.00]	[0.00]	[0.00]
Equity capital ratio	0.284***	0.299***	0.346***	0.275***
	[0.00]	[0.00]	[0.00]	[0.00]
Liquidity ratio	-0.174**	-0.199**	-0.244***	-0.168**
	[0.03]	[0.02]	[0.00]	[0.03]
Chair/CEO position	0.073**	0.082**	0.038	0.035
	[0.05]	[0.04]	[0.18]	[0.20]
Board size	-0.009	-0.003	-0.029	-0.006

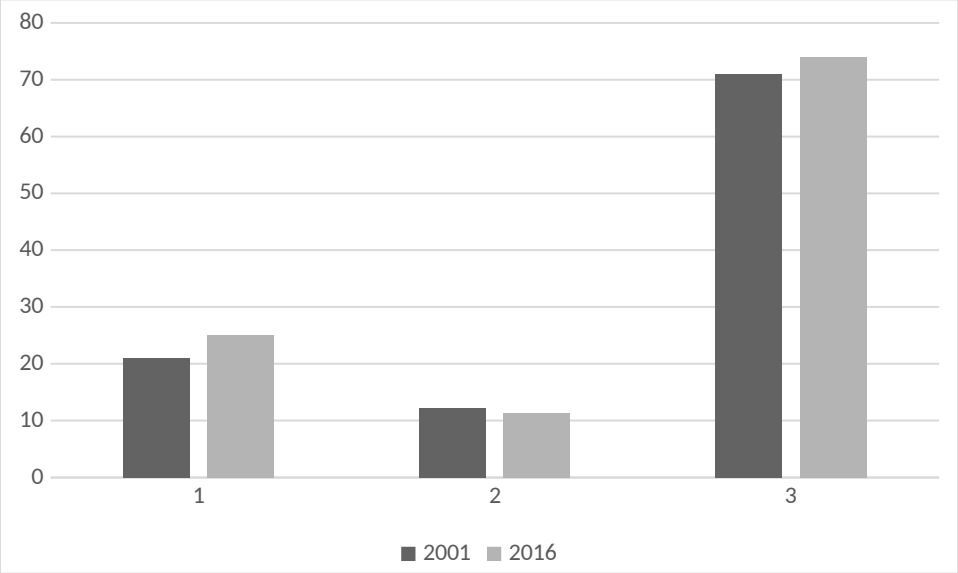
	[0.22]	[0.27]	[0.12]	[0.24]
Audit Committee	0.028*	0.021*	0.059**	0.019*
	[0.09]	[0.10]	[0.05]	[0.10]
Gender	0.049**	0.038*	0.029*	0.025*
	[0.04]	[0.06]	[0.08]	[0.10]

Variables	Commercial	Mortgage	Investment	Other
Financial expertise x board size	-0.024**	-0.020**	-0.052***	-0.019*
	[0.04]	[0.05]	[0.00]	[0.06]
Financial expertise x independent directors	0.030**	0.024*	0.063***	0.026*
	[0.04]	[0.06]	[0.00]	[0.06]
Constant	0.811*	0.826*	0.764*	0.944**
	[0.09]	[0.08]	[0.10]	[0.04]
Diagnostics				
R-squared adjusted	0.81	0.77	0.85	0.69
No. of instruments	28	25	26	27

AR(2)	[0.51]	[0.35]	[0.59]	[0.48]
Sargan/Hansen test	[0.54]	[0.50]	[0.74]	[0.51]
Number of observations	400	64	128	64

FIGURE 1. Descriptive Statistics.

The figure illustrates statistical information on the primary variables under consideration: the percentage of financial expertise across independent directors (1), board size (2), and the percentage of independent directors (3) for two years, 2001 and 2016.



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