Board Financial Expertise and the Capital Decisions of US Banks

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Abstract

We examine whether increasing financial expertise among independent directors facilitates bank capital decisions that promote financial stability. We find US banks with more financial expert independent directors opt for higher target capital ratios and adjust faster their capital structure when they are below the target. We provide evidence suggesting that our results are driven by the skill-set of these directors that lead to a better understanding of bank risks and access to external recapitalization choices. Our findings are further amplified by an increase in the exposure to losses of financial expert directors and by exogenous increases in regulatory scrutiny.

Keywords: Bank Capital, Bank Boards, Financial Expert Independent Directors, Regulatory Scrutiny

JEL: G21, G30

1 Introduction

This study presents the first empirical investigation of the interplay between the dynamics of bank capital and the financial expertise of independent directors. We use an empirical setting, as in Berger et al. (2018), De Jonghe et al. (2015), Flannery and Rangan (2006) and Lepetit et al. (2015), to examine how the financial expertise of independent directors influences the target capital ratio of US banks and how quickly these banks adjust towards this target.

Our analysis is motivated by the growing focus of the bank regulatory and policy debate on two objectives related to ensuring stability: 1) the importance of banks maintaining high capital ratios and avoiding lengthy periods of undercapitalization (Berger and Bouwman, 2013; Dinger and Vallascas, 2016); 2) the need to have independent directors on bank boards with financial expertise in order to increase the board understanding of the banking business (Adams and Mehran, 2012; Anginer et al., 2018; Basel Committee on Banking Supervision, 2015; Minton et al., 2014). However, despite financing decisions being an important part of board decision making (Bradley and Chen, 2015; Morellec et al., 2012), there is surprisingly very limited work that attempts to understand whether these two objectives are compatible. This is not obvious. In fact, from a theory perspective, the implications of the financial expertise of independent directors on a bank's capital dynamics are ex ante unclear.

Specifically, one view suggests that financial expert directors possess better skills in understanding the complex business models of banks and benefit from lower costs in acquiring information concerning financial transactions and the associated risks (Harris and Raviv, 2008; Minton et al., 2014). This skill advantage should result in more effective advising and monitoring roles in terms of financing choices that contribute to avoiding bank instability from badly managed capital decisions and the consequent potential loss of charter value for shareholders. Accordingly, financial expert directors are expected to prefer higher target capital ratios and a quicker

adjustment process in undercapitalized banks (Hau and Thum, 2009). A second view highlights instead a moral hazard perspective in which the better skills of these directors are instrumental in identifying risk-shifting opportunities that benefit shareholders at the expense of other stakeholders (Acharya et al., 2012; Keeley, 1990). These skills should then further incentivize banks to pursue financing policies based on risk-shifting objectives in favor of shareholders, and against the interests of regulators, that generally materialize with more independent boards (Anginer et al. 2018; Minton et al., 2014). Therefore, while the first view would imply that independent directors with financial expertise are beneficial for bank stability, the second view would lead to the opposite conclusion.

We base our analysis on a sample of 572 publicly traded US banks selected for the period 2001 – 2014, for which we construct a unique dataset of board structure variables by complementing databases such as BoardEx with manually collected data. Our initial step is the estimate of the target capital ratio and the influence of the financial expertise of independent directors on this ratio in a dynamic panel data setting. This first step is essential to subsequently quantifying the distance of banks from their target and implementing an empirical setting based on the drivers of the adjustment process.

We document that increasing the proportion of independent directors with financial expertise, while keeping constant overall board independence, increases the target capital ratio. This finding supports the first theoretical view and suggests, therefore, that independent directors with financial expertise recognize greater importance than other independent directors from holding more capital and avoiding bank distress (Acharya et al., 2016; Allen at al., 2011; Holmstrom and Tirole, 1997; Mehran and Thakor, 2011). Overall, our initial result complements the evidence based on a static framework, and reported by Anginer et al. (2018), according to which banks with more independent boards privilege lower capital ratios by highlighting that differences in terms of capital choices exist across different typologies of independent directors.

We next examine how a bank's board financial expertise influences the speed of adjustment towards their target ratio. By employing our initial estimates of target capital ratios, we derive a reduced form equation of the speed of adjustment that we estimate first for the full sample and then separately for banks below and above their target capital ratio. This latter distinction is important because major regulatory concerns arise for banks that are less capitalized; that is, when banks are plausibly operating well below their target ratio. In addition, the speed of adjustment is the result of the trade-off between the benefits and costs of adjustment and this varies substantially across banks above and below their target ratios (Lepetit et al., 2015; Morellec et al., 2012).

We find that increasing the financial expertise among independent directors significantly increases the speed of adjustment and, in particular, reduces the time banks remain below the target capital ratio. These findings highlight again the benefit of increasing financial expertise among independent directors to achieve a management of bank capital more aligned to the regulatory objective of enhancing stability. Our conclusion holds when we control for the potential endogeneity of board variables using a 2SLS setting where the geographic structure of the market for independent directors is used to identify appropriate instruments (Knyazeva et al., 2013) or when we exploit the impact of the Dodd-Frank Act (July 2010) on the recruitment of financial expert independent directors to be included in the board risk committee.

Our results are consistent with the view that the skills of financial expert directors lead to a better understanding of banking risks and to financing choices that facilitate the implementation of timely and less costly recapitalizations. For instance, these directors contribute to reducing the verification costs of financial information, thus safeguarding the interests of capital providers and facilitating external financing (Harris and Raviv, 2008). To further validate this interpretation, we show that our results are stronger when financial expert directors own a broad range of financial expertise, potentially signaling a better and wider financial skill set. Additionally, we show that the positive impact of financial expertise on the target ratio and the speed of adjustment of banks that

are below the target is stronger in riskier banks or when there are conditions of systemic instability that increase the risk of a bank distress. Finally, in line with the argument that financial expert directors facilitate the relationships with investors, we document that, differently from other independent directors, financial expert independent directors favor adjustment strategies when banks are below the target via accessing the equity market. This choice contributes to a faster bank recapitalization via more complex financing choices.

Some financial expert directors might have tighter wealth and career links within the financial industry that increase the importance they assign to the negative spillovers for the rest of the financial system potentially generated by a bank distress (Acharya et al., 2016; Allen et al., 2011; Holmstrom and Tirole, 1997). Accordingly, we progress by testing for the importance of the "skin-in-the-game" of these directors on our results. In particular, we show that our findings are stronger when financial experts are currently employed in financial firms or when they hold more than one directorship in financial corporations; namely, when the distress costs for financial expert directors are particulaly high. The key implication of these findings is that the regulatory benefits of financial expertise in the boardroom are further amplified when financial expert directors are potentially more exposed to personal losses.

A final set of tests assesses how our results vary with changes in the degree of regulatory scrutiny on banks. One strand of the literature shows that independent directors understand the negative reputational consequences when regulators lose trust in them (Baxter, 2003; Hagendorff et al., 2010), and these directors are aware of the regulatory preference for better capitalized banks. These arguments should be especially valid for financial expert directors given their plausibly stronger career interests within the financial industry. Another strand of studies shows bank policies are more prudent when regulatory oversight is stronger (Bassett et al., 2015; Hirtle et al., 2020; Krainer et al., 2009; Peek and Rosengren, 1995), thus implying bank insiders can also respond to a growing scrutiny. To examine how increases in regulatory scrutiny impact our results

we proceed in two ways. We initially follow Hirtle et al. (2020) and identify exogenous variation in regulatory scrutiny across the sampled banks by means of the geographic assignment of BHCs to Federal Reserve Districts. We show that when banks are subject to stronger regulatory scrutiny, they increase their target capital ratio and accelerate their adjustment process if they are below the target when the degree of financial expertise of independent directors increases. We achieve a similar conclusion when we use a difference-in-differences methodology based on the Dodd-Frank Act of July 2010 as a source of exogenous increase in regulatory scrutiny for banks with at least $10 billion of consolidated assets from 2011 (Bouwman et al. 2018). Ultimately, our analysis highlights the complementarities between internal governance and regulation by suggesting stronger regulatory oversight induces financial expert independent directors to opt for a bank capital management even more aligned with regulatory interests.

Overall, we show the degree of financial expertise shapes the preferences of independent directors in terms of capital management. As compared to other independent directors, financial expert directors seem to recognize more benefits from banks being adequately capitalized in a timely manner and this is related to their skills in understanding and implementing financing choices. Furthermore, we document these directors opt for even more prudent capital choices when they have more "skin-in-the-game" and when they are subject to a growing regulatory scrutiny. Our analysis shows that increasing the degree of financial expertise of independent directors is beneficial for the capital strength of banks.

Our study contributes to three streams of banking literature. First, we contribute to the literature on bank capital and governance (Anginer et al., 2016; 2018; Lepetit et al., 2015; Molyneux and Chunxia Jiang, 2014). Previous studies have examined the nexus between shareholder-friendly governance structures (including board independence) and the level of bank capital ratios (Anginer et al., 2016; 2018), the relationships between ownership structure, target capital and the speed of adjustment (Molyneux and Chunxia Jiang, 2014), and how shareholder rights influence the

adjustment strategies in European banks (Lepetit et al., 2015). Our analysis provides novel evidence on i) the role of financial expertise among independent directors on three aspects of bank capital management (the choice of the target ratio, the speed of adjustment and the financing choices to implement the adjustment), and ii) how board attributes influence the adjustment choices when banks are below or above their target capital ratios.

Second, we contribute to studies on the importance of bank independent directors' backgrounds in shaping their monitoring and advising roles (Adams et al., 2018; Aebi et al., 2012; Erkens et al., 2012; Minton et al., 2014). Only a handful of these studies have looked at proxies of financial expertise and their relationship with risk and performance - focusing on the global financial crisis with contrasting conclusions (Hau and Thum, 2009; Minton et al., 2014). The evidence on US banks is limited to Minton et al. (2014) that offers a negative picture of the influence of financial expert directors on bank performance during the crisis. In addition to the different outcomes investigated, however, we employ a significantly larger sample of US banks and a longer time period that is not confined to the crisis period.

Third, we contribute to the literature on the potential complementarities between a bank's internal governance structure and regulation. Previous studies have examined these complementarities in the context of the market for corporate control (Hagendorff et al., 2010). Moreover, there is some evidence on the nexus between director compensation and US banking deregulation (Becher et al., 2005). However, to the best of our knowledge no study has examined these complementarities in the context of a critical aspect of the banking business from a regulatory perspective; namely, the capital structure dynamics of a bank.

The paper proceeds as follows. Section 2 discusses the literature and theoretical background. Section 3 describes the sample, the econometric setting and the variables employed in our analysis. Section 4 documents the empirical results and Section 5 concludes.

2 Literature and Theoretical Background

Given the specificities and complexity of bank business models, there has been a growing regulatory emphasis on the importance of appointing independent directors to bank boards with some form of financial expertise (Basel Committee on Banking Supervision 2015).[1] However, the business consequences of increasing financial expertise onto bank boards are yet to be fully understood. In particular, the implications in terms of bank capital management are to date unexplored, in spite of bank capital being pivotal for financial stabiliy and consequently one of the key targets of regulatory interventions (Berger and Bouwman, 2013) .

To understand these potential implications, in this study we take a dynamic perspective on bank capital (Berger et al., 2018; De Jonghe et al., 2015; Lepetit et al., 2015; Flannery and Rangan, 2008). In this perspective, banks decide their target capital ratio and how quickly to adjust to this target. As a result, the choice of the target drives the capital strength of banks and the adjustment process influences how long banks maintain conditions of "undercapitalization", thus remaining more vulnerable to shocks, and how these conditions are addressed with potential (negative) spillovers on the rest of the system. Using this perspective as a point of departure, we argue that there are several, although constrasting, reasons as to why the degree of financial expertise of independent directors can influence the trade-off between the costs and benefits that conventionally drive the choice of the target capital ratio of banks and the adjustment towards this target ratio (see Minton et al. (2014) for a related point).

In particular, the degree of financial expertise is a key element of the human capital of independent directors that can potentially affect their monitoring and advising ability on the executive team (Guner et al., 2008; Kor and Sundaramurthy, 2009). In fact, more financially expert independent directors are seen as more likely than other independent directors to identify risks that

[1] https://www.bis.org/bcbs/publ/d328.htm

would undermine the stability of the bank and guide bank executives in avoiding such risks in the interest of shareholders (Minton et al., 2014). Along these lines, several studies document that bank shareholders are responsive to the bank's charter value (see, Keeley, 1990; Park, 1997), that has to be sacrificed in the case of failure (Park and Peristiani, 2007). Furthermore, it is highlighted that the role of financial expert directors is facilitated by lower costs in the acquisition of information concerning financial transactions and the associated risks (Harris and Raviv, 2008). Hau and Thum (2009) offer empirical support to this view by showing that German banks achieved better performance during the crisis when they had more financially competent boards.

Additionally, the skill advantage of financial experts might also result in a more direct impact in terms of financing choices via external funding. More precisely, in any corporations, including banks, boards spend a significant amount of their time in advising the management - including issues related to capital raising (Guner et al., 2008; Huang et al., 2009). In this respect, the presence of financial expertise is supposed to improve relationships with capital providers. For instance, Raheja (2005) argues that in complex and risky firms, such as banks, financial expertise in the boardroom reduces the verification costs of financial information, thus safeguarding the interests of capital providers and facilitating external financing in the capital markets. In a similar vein, Guner et al. (2008) highight that an increased financial expertise in the boardroom should facilitate access to external financing by lowering information asymmetries for investors.

Ultimately, the arguments above imply that a higher presence of financial experts among independent directors should induce banks to opt for more prudent capital choices due to a better understanding of banking risks and consequently result in a higher target capital ratio and a quicker adjustment process towards this target ratio when banks are undercapitalized. This contribution of financial expert directors to bank capital management will be facilitated by the decrease in adjustment costs that the presence of these directors should enable. It follows that financial expertise independent directors are expected to be beneficial for financial stability.

An alternative view, however, rooted in the findings reported in Minton et al. (2014), places emphasis on the better skills these directors might possess in identifying risks that are primarily beneficial to shareholders and to understanding the advantages of exploiting the explicit and implicit government guarantees given to banks via an increase in the residual claims of a bank's shareholders (Acharya et al., 2012; Keeley, 1990). In particular, the starting point of this second view is that all independent directors are conventionally more aligned with shareholder interests rather than with stakeholder interests and higher capital ratios are costly for bank shareholders (Diamond and Rajan, 2001; Gorton and Winton, 2017). In fact, highly leveraged firms such as banks transfer more value to creditors when they raise equity, as in the conventional "debt overhang" situation (Myers, 1977). Furthemore in banking the strong disincentive for shareholders to raise equity (and a related strong incentive to raise debt) is further exacerbated by implicit and explicit government guarantees and the related opportunities to shift risks towards other stakeholders (Minton et al., 2014).

Using this second perspective, that assigns importance to risk-shifting incentives, financial experts, more than other independent directors, should have the skills to facilitate the implementation of capital adjustment choices inspired by risk-shifting opportunities and strategies in the interest of shareholders and thus against the regulatory purpose of ensuring bank stability. Essentially, financial expert independent directors, more than other independent directors, should push executives towards reduced target capital ratios and a slower speed of adjustment when banks are below the target ratio. In other words, since the disincentives to increase equity ratios by shareholders should prevail over any incentive, boards with more financial expertise among independent directors are expected to slow down the adjustment process of their banks when they are below the target. In contrast, when banks are above target, financial expert independent directors should help bank shareholders to quickly exploit their residual debt capacity (Admati et al., 2018), because of their ability to lower adjustment costs via the debt market and the limited

importance assigned to distress costs produced by an increase in leverage. Using this second perspective, therefore, financial expert independent directors should be detrimental for financial stability.

3 Sample, Model and Variables

3.1 Sample and Data Sources

We employ a sample of 572 publicly traded US banks selected for the period 2001 – 2014. We obtain the sample by matching the population of listed US banks in BoardEx, from where we extract governance data, with COMPUSTAT BANKS that provides accounting data. The sample includes banks that become inactive/delisted or are acquired/merged during the period under investigation to eliminate potential survivorship bias.

[Insert Table 1 Here]

BoardEx holds data on a limited number of listed banks pre-2004 and the sample size increases from 2004. Therefore, to reduce the impact of missing data on our analysis, we hand-collected governance data from DEF-14A reports for all banks that exist in BoardEx from 2004 but are missing in the initial part of the sample period. These additions make our dataset unique and extensive, both in regard to the number of banks and the length of the sample period. Table 1 shows that the yearly distribution of banks ranges from a minimum of 173 (in 2001) to a maximum of 339 (in 2008) with an average of 289 banks per year. The maximum number of observations we employ in our analysis is equal to 4,047 over a 14-year period. In terms of total assets, our sample represents on average 75% of the population of U.S. banks. Finally, it is worth noting that the average number of banks in our sample per year (289) is larger than what is reported in recently published studies on bank governance (see, for instance, Anginer et al. (2018) that has employed a sample with on average 266 US banks per year).

3.2 Target Capital Ratio and the Variable Speed of Adjustment

In our empirical setting banks have a target capital ratio and they move towards this target with a speed of adjustment that varies with their characteristics (Berger et al., 2008; 2018; De Jonghe and Öztekin, 2015). Board composition, and in particular the degree of financial expertise of independent directors, is one source of heterogeneity across banks that drives their target capital ratio and how quickly they adjust to the target.

3.2.1 Estimating the target capital ratio

Following Berger et al. (2008; 2018) and Lepetit et al. (2015), we estimate the target capital ratio in terms of total equity divided by total assets (**Equity**). As shown in Panel A of Table 2, this variable has a sample mean of 9.8%, a value similar to what is reported by previous studies (Acharya et al., 2015; Anginer et al., 2018; Berger et al., 2008; 2018; Flannery and Rangan, 2008). Notably, our results are unchanged if we employ an alternative measure of a bank's capital ratio (the Tier 1 regulatory ratio, defined as Tier 1 capital scaled by total risk weighted assets).

[Insert Table 2 Here]

We estimate the target capital ratio using a partial adjustment model where the speed of adjustment is initially assumed to be the same across banks (De Jonghe and Öztekin, 2015; Lepetit et al., 2015). The starting point of the model is the relationship reported below:

$$Equity_{i,t} - Equity_{i,t-1} = \lambda(Equity^{*}_{i,t} - Equity_{i,t-1}) + \varepsilon_{i,t} \quad (1)$$

$Equity_{i,t}$ is the observed capital ratio at time t, $Equity_{i,t-1}$ is the bank capital ratio of the previous year and λ is the coefficient of the adjustment speed ranging between 0 and 1. The closer λ is to 0, the slower the bank capital adjustment process and the longer the time a bank takes to achieve its target capital ratio. $\varepsilon_{i,t}$ is a random error term, $Equity^{*}_{i,t}$ is the (*unobserved*) target capital ratio that

depends on a vector of lagged bank governance characteristics (**BG**), other lagged bank characteristics (**X**), year dummies (**Year**) and bank fixed effects (η_i) as written below:

$$Equity^{*}_{i,t} = \vartheta BG_{i,t-1} + \delta X_{i,t-1} + \varrho Year_t + \eta_i \quad (2)$$

Substituting equation (2) into equation (1) yields the following partial adjustment model:

$$Equity_{i,t} = (1-\lambda) Equity_{i,t-1} + \lambda\left(\vartheta BG_{i,t-1} + \delta X_{i,t-1} + \varrho Year_t + \eta_i\right) + \varepsilon_{i,t} \quad (3)$$

The constant speed of adjustment is, therefore, equal to 1 minus the estimated coefficient of the lag value of equity. Furthermore, for each explanatory variable the coefficient of equation (2) can be obtained by dividing the respective coefficient from equation (3) by the constant speed of adjustment. We estimate equation (3) using the System GMM estimator (Blundell and Bond, 1998). This estimator addresses endogeneity by combining the moment conditions from the first-difference and level equations. Bank-specific variables are modelled as endogenous covariates and we choose a set of instruments that fulfills two conditions (Wintoki et al., 2012): i) exogeneity and ii) explanatory power. Accordingly, for bank characteristics, we employ the second lag difference of the endogenous variables as instruments in the level equation and lag values from $t-2$ to $t-5$ of the same variables in the difference equation.

We use the Hansen J test of over-identifying restrictions to validate the choice of the instruments and select the optimal lag structure of each instrument using the difference in the Hansen test statistic. We choose the optimal lag for each instrument for the equations in level and difference as the lag that allows us not to reject the difference in the Hansen test of exogeneity of instruments based on a chi-square statistic. Furthermore, we verify the absence of second-order

serial correlation in the first difference residual using the m2 statistic (Arellano and Bond, 1991). We use the option "collapse" in STATA to avoid the bias due to a large number of instruments.[2]

3.2.2 Estimating the variable speed of adjustment

Using the estimated coefficients from equation (3), we calculate the target capital ratio at time *t* ($Equity^{*}_{i,t}$) and next the difference between this target ratio and the actual capital ratio in year *t-1* ($\widehat{DIFF}_{i,t-1}=Equity^{*}_{i,t} - Equity_{i,t-1}$). We finally allow the speed of adjustment $\boldsymbol{\lambda}$ to vary with bank governance and bank fundamentals as formalized below (see, Bakkar et al., 2019):

$$\lambda_{i,t}=\lambda_0+\xi Z_{i,t-1} \tag{4}$$

Where, $\boldsymbol{\xi}$ is a vector of coefficients for the speed of adjustment function, and $\mathbf{Z}_{i,i-1}$ is a set of bank specific variables that determine the speed of adjustment. Substituting equation (4) into equation (1), we obtain the *Variable Speed of Adjustment* (VSOA) model.

$$Equity_{i,t}-Equity_{i,t-1}=(\lambda_0+\xi Z_{i,t-1})(Equity^{*}_{i,t}-Equity_{i,t-1})+\varepsilon_{i,t} \tag{5}$$

This model can be rewritten as:

$$Equity_{i,t}-Equity_{i,t-1}=(\lambda_0+\xi Z_{i,t-1})\widehat{DIFF}_{i,t-1}+\varepsilon_{i,t} \tag{6}$$

This is equivalent to the following model:

$$Equity_{i,t}-Equity_{i,t-1}=\lambda_0\widehat{DIFF}_{i,t-1}+\xi Z_{i,t-1}\widehat{DIFF}_{i,t-1}+\varepsilon_{i,t} \tag{7}$$

The marginal effects of DIFF for different values of $Z_{i,t-1}$ offer estimates of the different values

[2] The System GMM estimator yields higher levels of both consistency and efficiency than other estimators proposed by Arellano and Bond (1991). Furthermore, it allows us to incorporate time persistent variables in our model. This is important for our study as most of the corporate governance variables vary slowly over time. We estimate the System GMM specification via a two-step approach that is asymptotically efficient in the estimation of the coefficients but causes a downward bias in the standard errors that we correct using the Windmeijer (2005) correction process.

of the speed of adjustment within the sample. Essentially, the explanatory variables are the product between $\widehat{DIFF}_{i,t-1}$ and the determinants of the variable speed of adjustment in equation (4). Following previous studies (see Berger et al., 2008; 2018), and in the interest of brevity, in the tables we refer to these interaction terms directly with the name of the variables in equation (4). We estimate equation (6) initially for the full sample and then separately for banks above ($\widehat{DIFF}_{i,t-1}<0$) and below ($\widehat{DIFF}_{i,t-1}>0$) the target via pooled OLS regressions (Berger et al., 2008; De Jonghe and Öztekin, 2015).

3.3 Measuring Financial Expertise and the Selection of Control Variables

Panel B of Table 2 reports summary statistics of the governance variables we employ. The key variable is the ratio between the number of financial expert independent directors and the number of non-financial expert independent directors (**Financial Expertise**).[3] Our definition of financial expertise follows the SEC.[4] Similarly to Minton et al. (2014), we include this variable simultaneously with the number of independent directors divided by board size (**Board Independence**). The coefficient of **Financial Expertise** indicates, therefore, the impact on the bank capital variable due to an increase in the degree of financial expertise onto the boards for a given degree of board independence. In the robustness section, we show that our findings remain unchanged if we employ numerous alternative specifications, including different ways to measure the degree of financial expertise within a bank's board.

[3] As in BoardEx, we define directors to be independent if they are not current or former employees of the bank, and do not share any family or material business relation with the bank or its employees/management. Directors can sit on the board of both the parent bank and one of its subsidiaries. However, regulators do not allow an executive of one bank to sit simultaneously on another non-affiliated bank's board. We follow Minton et al., 2014 and do not classify a current executive working at a subsidiary of the bank to be a financial expert independent director.

[4] The SEC identifies financial experts based on their current and past working experience and education. https://www.sec.gov/news/press/z2003-6.htm. Financial working experience is when directors currently hold or held a position in a bank/financial organisation, have an experience working as a CFO, accountant at a non-financial firm. Financial education includes if a director has a MBA, CFA, CPA, or a Finance related degree. For instance, Mr. Alain Juan was a member of the board of directors of CITIGROUP PLC in 2011 and is also a special limited partner of Warburg Pincus LLC, a world class investment fund since 2009. Similarly, Gary Crittenden was a senior executive of HGGC American Financial firm (2013-2018) and served as an independent director on the board of Zions Bancorporation in 2016.

In terms of governance controls, we also include a dummy equal to one if the CEO is the chairman of the board (**CEO Duality**), the log of the average age of board members (**Board Age**) and of the number of board members (**Board Size**). CEO Duality indicates less shareholder-oriented boards that should opt for capital management choices less aligned with shareholder interests (Berger et al., 1997). Younger directors should have bigger career concerns and this may lead to a higher target and a faster adjustment process (Jiang et al., 2016). Less clear is the impact of board size on capital management. Larger boards are potentially more efficient monitors and advisors of managers in complex organizations (Adams and Mehran, 2012; Pathan and Faff, 2013), but they might also have larger coordination problems among directors, thus leading to the poor monitoring of managers (Hermalin and Weisbach, 2001).

Panel C shows additional controls from the capital structure literature (i.e., Berger et al., 2008; Gropp and Heider, 2010). Higher values of the ratio between fixed to total assets (**Tangibility**) signal lower asset substitution problems and agency cost of debts. The ratio between non-performing loans to net loans (**NPL**) accounts for bank risk that should positively influence capital (De Jonghe and Öztekin, 2015). Non-interest income divided by total operating income (**Non-Interest Income**) measures the importance of less capital intensive business lines that lower the probability of a bank experiencing a large deviation from the target ratio (Jokipii and Milne, 2011). The variable net income/total assets (**ROA**) controls for bank profitability. More profitable banks have easier access to the debt market that should result in higher leverage. Furthermore, higher profitability reduces bankruptcy and financial distress costs (Berger et al., 2018); as such when below (above) the target more profitable banks may adjust slowly (quickly) towards this target.

The dividend to assets ratio (**Dividends**) and the market to book ratio (**Growth Opportunities**) account for the agency costs arising from free cash flow. Larger dividend payments and growth opportunities should lead to a higher target capital ratio and a faster (slower) speed of adjustment in banks below (above) the target (Gropp and Heider, 2010). Nevertheless,

higher dividends might facilitate the possibility to raise equity when needed thus inducing banks to be more leveraged (Gropp and Heider, 2010).

The ratio between income tax paid and income before tax (**Effective Tax Rate**) controls for the tax benefits of debt that favors leverage (see Byoun, 2008). Two additional controls are the log of bank total assets (**Size**) and the S&P credit rating **(Ratings)** converted to a number ranging from 1 to 9.[5] Larger banks and banks with better credit quality have easier access to the debt markets and this might lower the target ratio (Berger et al., 2008; Cook and Tang, 2010; Gropp and Heider, 2010). Additionally, implicit and explicit too-big-to-fail guarantees might reduce the incentives to proceed with a quick adjustment when a large bank is below the target.

The log of the number of analysts (**Analysts**) and the proportion of shares outstanding held by institutional investors (**Institutional Ownership**) control for information asymmetry and ownership structure (Flannery, 1998; Healy and Palepu, 2001). Analysts improve bank transparency (Irvine, 2003; Lee and So, 2017), and this should result in a higher target capital and a quicker adjustment speed. Institutional shareholders might exacerbate the conflicts between dispersed creditors which result in moral hazard problems that lower the target ratio and the speed of adjustment when banks are below this target (Becht et al., 2012). Finally, we include a dummy equal to one for the period a bank was in the TARP program (**TARP Bank**), as this could influence its capital management.[6]

4 Board Independence, Financial Expertise and Bank Capital Management

4.1 Target Capital Ratio and Deviations from the Target

Panel A of Table 3 shows the results for equation (3). Column (1) reports the estimated coefficients from equation (3), while column (2) shows the coefficients for the target capital

[5] We define credit rating as a categorical variable that takes values from 1 to 9. Where 1 = No ratings, and 9 = A+.
[6] Table A.1 in the Online Appendix does not suggest the presence of a high correlation among the control variables.

equation that we have obtained by dividing the coefficients in column (1) by the speed of adjustment (equal to 1 minus the estimated coefficient of $Equity_{i,t-1}$). Panel B of Table 3 reports summary statistics for the estimated target capital ratio and the deviation from the target derived from our estimates (namely, the difference between the target capital ratio and the actual capital ratio (DIFF)). The average target ratio is 10%, while the average deviation from the target is 0.2%.[7]

[Insert Table 3 Here]

We find that banks adjust their capital ratio at an approximately yearly rate of 21.8%, implying that banks take, on average, more than 4 years to close the gap between the target and the actual capital ratio.[8] This conclusion is similar to the finding reported by other studies (Berger et al., 2008; De Jonghe and Öztekin, 2015; Memmel and Raupach, 2010). More importantly, we find that increasing the degree of financial expertise in a bank's board (while maintaining unchanged board independence) increases the target capital ratio. The fact that board independence is negatively associated with a bank's target capital ratio is consistent with previous evidence based on a static framework (see, for instance, Anginer et al., 2016). Taken together, our results highlight that the financial expertise of independent directors is critical in shaping their preference on capital management (Acharya et al., 2015; Anginer et al., 2016; Erkens et al., 2012; Pathan, 2009).[9]

[7] The average (observed) capital ratio of banks below (above) target capital is 9.1% (11.5%). The difference between the mean values of the two groups is statistically significant at the 1% level.

[8] The adjustment made by banks in the 4-year time period is calculated as (1-(1-0.782)4) = 99%

[9] Other governance variables influence the target capital ratio. We find that CEO duality, signaling less shareholder influence on bank boards, has a positive impact on the target ratio. Furthermore, Board Age also has a negative influence on the target ratio, showing younger boards favor equity over debt. In terms of bank-specific controls, our results are consistent with the existing literature (Anginer et al., 2016; Benston et al., 2003; Diamond and Rajan, 2000; Flannery and Rangan, 2008; Gropp and Heider, 2010). The bank target capital increases with bank risk (De Jonghe and Öztekin, 2015; Jokipii and Milne, 2008), the non-interest-income share and growth opportunities (Frank and Goyal, 2009; Harris and Raviv, 2008), whereas it decreases with the degree of institutional ownership (Flannery, 1998), size, and the consequent too-big-to fail benefits (Berger et al., 2008; Brewer et al., 2008), ROA (Berger et al., 2018) and credit rating (Berger et al., 2008; Kisgen, 2006). Furthermore, banks show larger target capital ratios during the period they were subject to the TARP program.

In terms of economic impact, we observe that an increase of one standard deviation of financial expertise produces an increase in the observed capital ratio of 48 basis points, equal to about 4.85% of the sample mean. The impact on the target ratio (column (2)) is, however, significantly larger being equal to an increase of 217 basis points equivalent to 21.7% of the mean target ratio. The economic importance of improving the financial expertise among independent directors is further highlighted by Figures 1a and 1b. These Figures report the percentage point increase in the target ratio and the relative increase with respect to the median target ratio produced by replacing up to 3 directors with no expertise with financial expert directors.[10] We find that replacing two non-experts with two experts (approximately equal to just less than a one standard deviation increase in the Financial Expertise variables), increases the target capital ratio by about 216 basis points with a relative increase of approximately 21.6% in the target ratio. These numbers almost double with the replacement of a further additional director. Ultimately, we find that an increase in the financial expertise among independent directors in the boardroom contributes to a closer alignment of the interests of board members with those of regulators in terms of capital management.

[Insert Figures 1a and 1b Here]

Overall, one of the key implications from our analysis is that replacing one insider with one independent director has detrimental effects on a bank's capital dynamics but much less so if the new independent director has financial expertise. In particular, for the average board in our sample (that has 11 members and a 79.8% degree of independence), using the estimated coefficients in Table 3, we observe that the negative effect on the target capital produced by replacing one insider

[10] To compute the economic impact of replacing 1 non-financial director with 1 financial director, we proceed as follows. We consider the average number of financial experts on a board and the average number of non-financial experts on a board. We next increase the average financial experts by one unit and decrease the non-financial experts by one unit. We then multiply the difference between the new and old (average) ratio financial experts/non-financial experts with the estimated coefficient for this variable in Table 3. We follow a similar approach to assess the impact of replacing two or more non-financial expert directors.

with an independent director can be counterbalanced by a positive effect if this addition results in an increase of one financial expert in the pool of independent directors.

4.2 Speed of Adjustment Results

We proceed by examining the relationship between financial expertise and the speed of adjustment towards the target capital ratio. We report the results from equation (7) in Panel A of Table 4 and Panel B offers estimates of the speed of adjustment for the average bank in the sample. The first column refers to the full sample and the following two columns refer to banks below and above the target capital ratio, respectively.

In the full sample, we find that an increase in financial expertise leads to a quicker speed of adjustment. This contrasts again with that negative coefficient associated with the overall degree of board independence. The full sample results, however, mask significant differences across the sub-samples of banks. Columns (2) and (3) show when banks are below the target, an increase in the proportion of financial expert directors increases the speed of adjustment towards the target ratio, whereas there is no effect when banks are above the target. Instead, more independent boards opt for a slower (quicker) adjustment process when banks are below (above) the target.

[Insert Table 4 Here]

In terms of economic impact, using the results in column (2), we find that an increase of one standard deviation in financial expertise produces an increase in the speed of adjustment in banks below the target of 163 basis points (equal to 7.4% of the average the speed of adjustment from equation (1)). This increase, therefore, seems more pronounced than what we observe for the observed capital ratio, highlighting the importance of financial expertise especially for the readjustment of the capital structure. The economic importance of improving financial expertise among independent directors is highlighted by Figures 2a and 2b. These Figures show the

percentage point increase in the speed of adjustment and the relative increase with respect to the baseline speed of adjustment from Table 2 that we observe after replacing up to 3 directors with no expertise with financial expert directors. In particular, replacing two non-expert directors with two expert directors produces an effect approximately equal to what we observe with an increase of one standard deviation in Financial Expertise (+161 basis points, equivalent to an increase of about 7.4% of the baseline speed of adjustment).[11]

[Insert Figure 2a and 2b Here]

The importance of differentiating banks that are below and above the target to understand how financial expertise affects the speed of adjustment becomes even clearer in columns (4) and (5). In these columns we look at the sub-set of banks that are extremely below (above) the target, defined as banks in the first (fourth) quintile in terms of deviation from the target ratio. We find that when banks are likely to be extremely undercapitalized, financial expert directors promote a significantly quicker adjustment process as compared to other independent directors and their effects seem to be economically even larger than what is documented in column (2).

To summarize, financial expert independent directors assign greater importance than other independent directors to the costs produced by deviations from the target and they seem especially aware of the risks and costs arising from conditions of extreme bank undercapitalization. In section 4.4. we offer further support to this argument.[12] Ultimately, financial expert directors mitigate the

[11] As in the case of the target results, an increase in financial expertise among independent directors can offset the negative effects due to more independence. In particular, if we use the average board in our sample as a benchmark, we find that an increase in 1 unit of independent directors has in absolute value terms an effect equivalent to an increase of 2 units of financial experts among independent directors.

[12] Other governance variables also have different effects on the speed of adjustment when banks are below or above the target capital ratio. For instance, column (3) shows that banks below the target capital ratio have a quick adjustment process (that does favour shareholders) in the presence of larger boards. In terms of bank controls, we find that above target capital banks with higher non-performing loans and non-interest income share and with lower profitability make slower downward adjustments. Larger banks and banks with more growth opportunities show a slower (quicker) adjustment process when they are above (below) the target ratio. Banks with higher dividend to assets ratio, effective tax rate and institutional ownership show a slower (quicker) adjustment process when they are below (above) the

attitude of more independent boards to opt for capital management choices that minimize the funding contribution of shareholders.

4.3 Robustness Tests

4.3.1 Controlling for endogeneity

Our baseline analysis accounts for some forms of endogeneity via the GMM estimator (see, Wintoki et al., 2012). However, our results might still be biased by the presence of endogeneity especially in the speed of adjustment equation. For instance, boards with more financial expertise might be preferred by banks opting for a capital dynamic that is less aligned to the interests of shareholders. In this section, we further account for endogeneity in two ways.

First, we estimate equation (6) using an instrumental variable setting that we report in panel A of Table 5. Our instruments for financial expertise follow from studies highlighting the local nature of the director labor market (Knyazeva et al., 2013; Wang et al., 2013). Accordingly, we employ the average value of financial independent directors in non-financial firms at the state level as an instrument for financial independent directors. Following a similar logic, we create an instrument also for board independence. The first stage regressions for banks below and above the target capital ratio show that the two instruments enter the models with a positive and highly significant coefficient (and the significance of the Cragg-Donald Wald F test for weak instruments suggests our setting does not suffer from a weak instrument problem). More importantly, the second stage regression shows our main results remain qualitatively the same.

[Insert Table 5 Here]

target ratio. Better credit rating accelerates the adjustment process when banks are above the target (and need more debt). Above target capital TARP banks make slower downward adjustments.

Second, we design a difference-in-differences analysis based on the governance consequences arising from the introduction of the Dodd Frank Act in July 2010. In particular, the Act requires BHCs with total consolidated assets of $10 billion or above to establish a risk committee with one member having financial expertise (on risk management matters). To isolate the effect of the Act on the composition of the committee from the effects due to the requirement to establish a risk committee, we proceed as follows. We identify 32 banks in our sample that had already a risk committee prior to the Act and then differentiate those that have added a new financial expert director after the Act from the remaining banks. We identify 21 banks in our sample (treated banks) that already had risk committee and hired a financial expert director onto their board. We then compare these banks with 11 untreated banks (banks that had risk committee but did not hire a financial expert director onto their board) by re-estimating a revised version of equations (3) and (6) over the estimation window 2008-2014. Specifically, we include in the equations an interaction term between a variable **Post**, taking the value of 1 from 2011 to 2014, and a dummy **Treated** with a value of 1 for banks with a risk committee that hired financial expert directors. The coefficients of interest are **Post × Treated**, measuring the impact of an exogenous increase in board financial expertise on bank capital (speed of adjustment). As shown in Panel B of Table 5, the results confirm our initial conclusion: an increase in financial expertise increases the target capital ratio and the speed of adjustment to this target of undercapitalized banks.

Although we acknowledge the difficulties to fully rule out endogeneity concerns and the limitations of the tests we present above, taken together the findings discussed in this section point in the same direction and add further confidence on the robustness of our conclusions.

4.3.2 Alternative dependent variable and additional specifications

Our analysis has focused on the equity ratio because it is less subject to manipulation by bank managers than regulatory capital measures. As a result, it is potentially a more reliable indicator of

bank capital adequacy. However, the primary regulatory focus in terms of bank capital is on risk-based capital ratios and assessing the coherence between governance and the capital framework surrounding banks might also require a focus on these ratios. To account for this aspect, in Table A.2 of the Online Appendix we replicate the analysis using the Tier 1 risk-based ratio as our key dependent variable. Our findings remain unchanged.

We then further control for the confounding effects of the TARP program and on the possible heterogeneity induced by the financial crisis in several ways. Specifically, we repeat the analysis by removing from the sample banks that have received TARP funding (Table A.3) and by adding as a further control the ratio between the amount of TARP funding received by a bank scaled by its total assets (Table A.4). The addition of this control allows us to remove the impact of public recapitalization on the equity ratio. Furthermore, we estimate the models separately for the period before and since the global financial crisis (Table A.5). All these tests confirm our findings.

Given the positive correlation between the variables Board Independence and Financial Expertise, the opposite results we obtain for these two variables might reflect a non-linear effect of board independence on capital dynamics. Furthermore, the joint inclusion of these two variables could make the interpretation of our results less intuitive. We proceed in three ways to rule out this explanation. First, we repeat our analysis by removing board independence as a control (Table A.6). Second, we re-estimate the model (with and without board size and board independence) using the log of 1 plus the number of financial experts on bank boards as an alternative measure of financial expertise (Table A.7 and Table A.8). Third, we add the square value of Board Independence to the models (Table A.9). Our findings remain largely unchanged across all these specifications.

Finally, large banks might have better access to capital markets and this might affect the choice in terms of the target ratio and the speed of adjustment. However, Table A.10 shows that our

findings remain unchanged if we exclude from the sample very large banks (that is, banks with total assets above the 90th percentile of the sample distribution).

4.4 Additional Evidence on the Importance of Financial Skills

4.4.1 The richness and depth of financial expertise and capital management

Our findings support the view that financial expert directors have better skills than other directors in understanding the complexity of bank business models and the importance of capital to contain the related bank exposure to risks (Minton et al., 2014). These skills result in more timely and less costly recapitalizations in banking firms whose benefits are primarily visible for undercapitalized banks. Along these lines, it is argued that the presence of these independent directors contributes to reducing the verification costs of financial information, thus safeguarding the interests of capital providers and facilitating external financing (Harris and Raviv, 2008).

In this section, we offer further evidence on the importance of the skills of these directors for a bank's capital management by exploiting differences across financial experts in terms of the richness and depth of their expertise. If our results indeed reflect better director skills in understanding bank business models and implementing financing policies, we should expect stronger results when these directors have a broader range of financial expertise.

[Insert Table 6 Here]

To conduct the test, in Panel A of Table 6, we construct a variable based on the log transformation of the number of financial experts that have a combination of financial education with (past or current) working experience in a financial firm (**Skill Range**). We next interact this variable with our proxy of board financial expertise. It is important to note that an increase in Skill Range does not necessarily imply a change in board independence or a change in the ratio between financial expert independent directors and non-financial expert independent directors. Second, in

Panel B of Table 6 we employ a further interaction based on the log transformation of the number of financial expert directors with previous experience as members of an audit committee (**Audit Committee Experience**). We consistently find that our results are significantly amplified by financial experts with a richer set of financial expertise. In other words, a broader range of financial skills owned by financial experts is an important driver of their influence as financial expert independent directors on bank capital. This is in line with the argument that our results reflect these directors having skills that allow them to understand the specificities of the banking business and implement more timely and less costly financing choices to avoid excessive risk exposure. We further develop this point in the next sections.

4.4.2 Bank risk, financial expertise and capital dynamics

To further validate the interpretation above, we next extend our baseline target capital and speed of adjustment models by interacting financial expertise with a proxy of bank risk, Non-performing loans (NPL), and a measure of aggregate systemic risk (CATFIN) defined as in Allen et al. (2012). CATFIN captures the aggregate tail risk in the whole financial industry with larger values indicating more severe systemic conditions and anticipating future macroeconomic downturns. If financial expert directors have a better understanding of the importance of capital to avoid excessive risk exposure, we should observe they target higher capital ratios and accelerate the speed of adjustment when banks are below the target, especially when their banks hold riskier portfolios or aggregate systemic risk is high.

[Insert Table 7 Here]

Panel A of Table 7 reports the result of the importance of bank portfolio risk, while Panel B shows the impact of aggregate systemic conditions. More precisely, in column (1) of the two Panels we show the results for the target capital equation and then in the next two columns we report the speed of adjustment equations estimated separately for banks below and above the target ratio.

Furthermore, in columns (4) and (5), we show the results for banks characterized by extreme conditions of "undercapitalization" or "overcapitalization" as defined in section 4.2.

We find that an increase in the degree of financial expertise among independent directors leads to larger target ratios and accelerates the adjustment process of banks that are below the target, especially when a bank is riskier or the overall systemic conditions are more negative.[13] Taken together the results in this section point in the same direction: when holding less capital is more likely to lead to a bank default, the presence of more financial expertise in the board promotes capital dynamics more in line with the regulatory objectives of safeguarding stability.

4.4.3 Financial expertise and the adjustment process

Another way to highlight the importance of the particular skills owned by financial experts for bank capital management is to look at the funding strategies implemented by banks to reach their target capital ratio. If financial expert directors are indeed different from other independent directors, we should observe an impact of financial expertise also in terms of the adjustment process. For instance, if these skills facilitate access to external funding as implied by the arguments in Harris and Raviv (2008), we should expect that funding strategies that require access to capital markets, such as equity issuances, are adopted especially when there is an increased presence of financial expert directors on boards.

In this section, we examine funding strategies based on equity adjustments and funding strategies based on asset adjustments. The *Equity Adjustment* channel includes 1) the change in the capital provided by shareholders *(⊿Equity Capital)*, calculated as the annual change in equity (minus

[13] In the Online Appendix we find similar results when, as in Boyd et al. (2006), we use the the log of the standard deviation of ROA over a 5-year rolling window as a measure of portfolio risk and the Chicago Fed's National Financial Conditions Index (NFCI) as a proxy for systemic conditions. The Chicago Fed's National Financial Conditions Index (NFCI) provides a weekly update on U.S. financial conditions in different parts of the financial system (including the traditional and "shadow" banking systems). Positive values of the NFCI indicate that financial conditions are tighter than average, while negative values indicate financial conditions are looser than average. We employ the yearly average in our analysis and create a dummy equal to one to identify years with values above the sample average.

net income, retained earnings and accumulated earnings), that should capture, in the case of an increase, access to the equity market, and 2) the change in retained earnings (⊿*Retained Earnings*). The *Asset Adjustment* channel consists of the annual change in other earning assets (⊿*Securities*) and the annual change in net loans (⊿*Loans*). We scale all changes by average bank assets (from time *t* to time *t-1*). Similarly to Lepetit et al., (2015), we then model the adjustment process as follows:

$$\Delta ADJ_{i,t} = \chi \Delta ADJ_{i,t-1} + \left[a_1 + \beta_1 Financial\ Expertise_{i,t-1}\right] \times Surplus_{i,t-1} + \left[a'_1 + \beta'_1 Financial\ Expertise_{i,t-1}\right] \times Deficit_{i,t-1}$$

$$+ \delta X_{i,t-1} + \sigma Year + \varepsilon_{i,t} \qquad (8)$$

Where $\Delta ADJ_{i,t}$ is one of the adjustment variables described earlier, $Financial\ Expertise_{i,t-1}$ is our key governance variable, *Surplus* and *Deficit* are the absolute value of the difference between the estimated target and the actual capital ratios when the bank is above or below the target level respectively, $X_{i,t-1}$ is a set of controls, *Year* is time dummies and finally $\varepsilon_{i,t}$ is a random error term. To mitigate the potential biases arising from endogeneity, all independent variables enter the model with a one-year lag. As in Lepetit et al. (2015), we estimate the model using the two-step system GMM.

We report the results in Panel A of Table 8. The first two columns refer to equity adjustments and the last two columns to asset adjustments. More precisely, in columns (1) and (2) we interact board independence and our financial expert measure with *Surplus* and *Deficit* using ⊿*Equity* and ⊿*Retained Earnings* as dependent variables, respectively. In columns (3) and (4) we repeat a similar analysis focusing on ⊿*Securities* and ⊿*Loans* as the dependent variables.

[Insert Table 8 Here]

In the presence of a capital deficit, financial expert directors favor the implementation of adjustments via equity issuance and decreases in securities to boost the capital ratio. These

strategies seem to facilitate a quicker adjustment process when banks are below the target. More importantly, the use of equity issuance is also consistent with the view that these directors facilitate access to capital markets via their skills. Finally, when banks are above the target, more financial expertise facilitates adjustment strategies based on a decrease in retained earnings and an asset expansion (in terms of securities and loans). In Panel B of Table 8 we repeat the analysis by interacting *Surplus* and *Deficit* with board independence. These additional specifications further highlight that the key difference in terms of adjustment process between financial expert directors and other directors emerges from the liability side. In fact, an increase in board independence does not lead to more equity issuance by banks with a capital deficit.

4.5 Does the Skin-in-the Game of Financial Expert Directors Matter?

Some typologies of financial expert directors might suffer larger personal losses than other directors from a bank's distress. These losses are due to the links of their personal wealth with the financial industry. In addition to the skill set of these directors, therefore, these links have the potential to further amplify the preference of these directors for more prudent choices in terms of capital management by amplifying their "skin-in-the game" and, consequently, their risk aversion. Below, we explore the validity of these conjecture using two empirical settings.

Some of the financial expert directors sitting on bank boards are currently employed in the financial industry. Therefore, the personal wealth of these directors can be directly and negatively affected by an unstable banking system via externalities produced by a bank distress. As a result, these directors should show stronger concerns over the consequences of a bank failure. We test for the validity of this argument in Panel A of Table 9. In this Panel we interact the Financial Expert variable with the log transformation of the number of financial expert directors currently employed in a financial firm. If the exposure to personal losses influences the preferences of financial expert directors in terms of bank capital, we should observe an effect through this

interaction term. In line with our expectation, we find that our results are amplified by an increase in the number of financial expert directors currently working in the financial industry.

[Insert Table 9 Here]

Another potential source of "skin-in-the-game" is related to the director labor market. In particular, many financial expert directors have a stronger labor market within the financial industry and the failure of the bank could also damage their directorships in other financial firms.[14] To understand the importance of this source of "skin-in-the-game" we interact our financial expertise variable with the log transformation of the number of directorships in other financial firms held by financial expert directors. We find that our results in the target equation are significantly stronger when financial expert directors have more board memberships in the financial industry. An increase in the number of these directors also induces a quicker adjustment process when banks are below the target.

Ultimately, this section suggests that the impact of financial expert independent directors on a bank's capital management is amplified when they have more "skin-in-the-game" due to their tight links with the financial industry. In this respect, we observe some commonalities with what might motivate the capital choice of risk averse managers employed in a bank (who are financial experts by definition).

4.6 How Does Regulatory Scrutiny Influence Our Results?

How changes in regulatory scrutiny influence our results is an open question. Regulators are key stakeholders in the banking industry whose interests tend to contrast with those of shareholders and potentially affect the capital preferences of independent directors (Vallascas et

[14] In our sample, around half of the financial experts hold directorships in more than one financial firm, whereas only 3 % of non-financial experts with a board seat in a bank hold at least another board membership in the financial industry.

al., 2017). However, financial expert directors are likely to have more career prospects in the financial industry, and more than other independent directors they should be concerned over the negative reputational consequences when regulators lose trust in them (Baxter, 2003; Hagendorff et al., 2010). Therefore, financial expert independent directors should become more supportive of the regulatory objectives to maintain high a bank's capital strength when regulatory scrutiny increases. Nevertheless, other studies show bank policies are generally more prudent when regulatory oversight is stronger (Bassett et al., 2015; Hirtle et al., 2020; Krainer et al., 2009; Peek and Rosengren, 1995). These findings might indicate that insiders also respond to an increase in regulatory scrutiny, thus making it unclear whether the impact of board composition on bank capital indeed varies with this scrutiny.

To document the interplay between board financial expertise and regulation, we focus on sources of exogenous variation in regulatory scrutiny across banks using two settings. In the first setting, we measure regulatory scrutiny (*Supervisory Attention)* by exploiting the geographic assignment of BHCs to Federal Reserve Districts as in Hirtle et al. (2020).[15] We use a dummy variable equal to one for the top 5 banks in each of the 12 Federal Reserve Districts in each year and zero otherwise. While the distribution of BHCs varies across districts in terms of asset size, complexity, geographic diversification, and numerous other business characteristics, Hirtle et al. (2020) show that in each District, the largest banks receive more supervisory attention. We then interact the scrutiny variable with financial expertise.

The second setting takes advantage of the changes in regulatory scrutiny due to the Dodd-Frank Act of July 2010 similarly to Bindal et al. (2020) and Bouwman et al. (2018). The act modifies the supervisory regime for banks with more than $10 billion of total consolidated assets by imposing more frequent regulatory inspections and the need to be subject to stress tests. We

[15] The structure of the Federal Reserve System is retrieved from https://www.federalreserve.gov/aboutthefed/structure-federal-reserve-system.htm

employ this exogenous shock to implement a difference-in-differences setting on how regulatory scrutiny affects our results. A critical step for this analysis is the choice of the "treated" and "control" groups of banks to be compared. We identify the groups similarly to Bindal et al. (2020) and Bouwman et al. (2018). The treated group includes banks with total assets between $10 billion and $20 billion. We do not use larger banks because we intend to reduce size heterogeneity with the control group and because the largest banks in our initial sample (those with assets above $50 billion) are subject to further regulatory prescriptions as compared to banks just above the asset threshold (Bouwman et al., 2018).[16] The control group includes banks with assets between $1 billion and $7 billion. The non-treated banks should be reasonably far away from the $10 billion threshold, otherwise they might experience an indirect effect of regulatory change by taking corrective actions with the intention of expanding their assets in the future (Bouwman et al., 2018).

We finally extend equations (3) and (7) with the addition of a dummy (*Treated)* equal to 1 for banks above the size threshold over the sample period (otherwise equal to zero) and a dummy (*Post)* equal to 1 from 2011 to 2014 that takes a value of 0 for the pre period defined as being from 2008 to 2010. We interact these dummies with Financial Expertise. Our key coefficients are the triple interaction terms between *Treated*, *Post* and Financial Expertise. Positive values of these interaction terms indicate an increase in the target capital (speed of adjustment) for treated banks after the implementation of the Act in the presence of an increase in the share of independent directors with financial expertise.

[Insert Table 10 Here]

Table 10 presents the results from the first empirical setting. Column (1) in Panel A shows that financial expert directors respond to an increase in regulatory scrutiny by increasing a bank's target capital ratio and the speed of adjustment when banks are below the target. Table 11 reports the

[16] Our results remain unchanged if we include in the control groups large banks up to $50 billion of total assets.

regression results for the second empirical setting and leads to similar conclusions. Specifically, an increase in regulatory scrutiny induces more financial experts among independent directors to increase the target capital ratio and the adjustment speed of banks below the target.

[Insert Table 11 Here]

Overall, regulatory scrutiny matters for how financial expertise impacts a bank's target capital and speed of adjustment.

5 Conclusions

We show that differently from what is assumed by previous studies on bank governance and capital ratios conducted using a static setting (Anginer et al., 2016; 2018), not all independent directors share similar preferences in terms of how a bank should manage its capital structure. In particular, adding independent directors with financial expertise to the board, while maintaining unchanged the degree of independence, increases the target capital ratio and leads to closing the gap between the target and actual capital ratio at a faster rate when the bank is operating below the target capital ratio. We show these findings reflect the skill set owned by these directors and document they are amplified when financial expert directors have more skill-in-the-game due to their personal career within the financial industry. In additional tests, we observe that a growing regulatory scrutiny induces directors with financial expertise, to opt for a bank's capital management to be more in line with the stability objectives of regulators. This finding highlights key complementarities between bank internal governance and regulation.

Overall, the key message of our analysis is that governance reforms aimed at increasing the financial expertise of independent directors are likely to be a relatively more coherent choice with the regulatory objective of ensuring banking stability, than reforms targeting a general increase in the degree of the independence of bank boards. A final note of caution in interpreting our findings

is warranted. Our results do not have to be seen as implying that other typologies of independent directors are useless in banking. In fact, our focus is limited to capital structure decisions and we do not consider the overall monitoring and advising effects of independent directors on bank business policies. Nevertheless, our analysis indicates that these capital effects have to be taken into account when assessing the overall costs and benefits of independent boards.

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Table 1: Sample Distribution by Year

This table reports the average number of bank observations per year over the sample period.

Year	Number of Banks each year	% Observations
(1)	(2)	(3)
2001	173	4.275
2002	199	4.917
2003	217	5.362
2004	251	6.202
2005	293	7.240
2006	327	8.080
2007	329	8.129
2008	339	8.377
2009	335	8.278
2010	302	7.462
2011	315	7.784
2012	317	7.833
2013	318	7.858
2014	332	8.204
Total	**4,047**	**100**
Total Unique Banks	**572**	

Table 2: Summary Statistics and Variable Description

This table provides the description and summary statistics of the explanatory and control variables employed in the study. All variables, except dummy variables, are winsorized at the 1% and 99% levels.

		N	Mean	Median	SD	p1	p99
Panel A: Dependent Variable							
Equity	Total Equity to Total Assets	4,047	0.098	0.094	0.034	0.041	0.208
Panel B: Governance Variables							
Financial Expertise	The ratio between the number of independent financial expert directors and the number of non-financial expert independent directors	4,047	0.351	0.393	0.679	0.000	3.000
Board Independence	The ratio between the number of independent directors and total board members	4,047	0.798	0.800	0.134	0.333	0.938
CEO Duality	Dummy variable equal to 1 if the CEO is also the chairman of the board	4,047	0.456	0.000	0.498	0.000	1.000
Board Age	Log of the average age of directors on the board	4,047	4.105	4.105	0.061	3.938	4.260
Board Size	Log of the total number of directors on the board	4,047	2.361	2.397	0.298	1.609	3.044
Panel C: Bank Controls							
Tangibility	The ratio between fixed to total assets	4,047	0.016	0.015	0.008	0.001	0.044
NPL	The ratio of non-performing loans to net loans	4,047	0.020	0.008	0.061	0.000	0.144
Non-Interest Income	The ratio of non-interest income divided by non-interest income plus net interest income	4,047	0.233	0.220	0.128	0.035	0.677
ROA	The ratio between net income and total assets	4,047	0.006	0.008	0.009	-0.039	0.021
Dividend	The ratio of dividends to total assets	4,047	0.003	0.003	0.002	0.000	0.010
Size	Log of total assets measured in millions of US dollars	4,047	7.543	7.139	1.609	4.968	13.920
Growth Opportunities	The ratio between market and book value of assets	4,047	1.528	1.096	2.135	0.000	13.217
Ratings	S&P credit ratings ranging from 1 to 9 (no ratings = 1, D = 2 → A+ = 9)	4,047	4.774	5.000	2.129	1.000	9.000
Analysts	Log of the number of analysts	4,047	0.739	0.000	0.969	0.000	3.222
Institutional Ownership	Total institutional ownership (% of shares outstanding)	4,047	0.307	0.238	0.836	0.000	0.889
TARP Bank	Dummy variable equal to 1 for the years during which bank remained under the TARP program	4,047	0.352	0.000	0.477	0.000	1.000
Effective Tax Rate	The ratio of income tax paid to pre-tax income	4,047	0.298	0.300	0.077	0.016	0.446

Table 3: Financial Expertise and the Target Capital Ratio

This table reports the results for the target capital equation described in section 3.2. We use a partial adjustment model to estimate the determinants of the target capital ratio under a constant adjustment speed framework. Column (1) in Panel A presents the estimates of the coefficient for the observed capital ratio and column (2) the estimates of the coefficients for the unobserved target ratio. Panel B reports the summary statistics of target capital and deviations from the target for banks below and above target capital. **Equity $_{t-1}$** is the lagged dependent variable (total equity divided by total assets). **Financial Expertise** is the number of independent financial expert directors divided by the total number of non-financial expert independent directors, **Board Independence** is the ratio between the number of independent directors and the total board members, **CEO Duality** is a dummy variable equal to 1 if the CEO is also the chairman of the board, **Board Age** is the log of the average age of directors on the board, **Board Size** is the log of the total number of directors on the board, **Tangibility** is the ratio between fixed to total assets, **NPL** is the ratio of non-performing loans to net loans, **Non-Interest Income** is the ratio of non-interest income to non-interest income plus net interest income, **ROA** is the ratio between earnings before interest and tax and total assets, **Dividends** is the ratio of dividends to total assets, **Growth Opportunities** is the ratio between the market and book value of assets, **Size** is the log of total assets measured in millions of US dollars, **Ratings** is the S&P credit ratings ranging from 1 to 9 (1= D and 9 = A+), **Analysts** is the log of the number of analysts, **Institutional Ownership** is total institutional ownership (% of Shares Outstanding), **TARP Bank** is a dummy variable equal to 1 for the years during which a bank remained under the TARP program, **Effective Tax Rate** is the ratio between total income tax paid and total income before tax. Robust standard errors, clustered at the bank level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Coefficients for the Observed Capital Ratio	**Coefficients for the Target Ratio**
Panel A: Regression Results	(1)	(2)
Equity $_{t-1}$	0.782***	
	(0.001)	
Financial Expertise $_{t-1}$	0.007***	0.032***
	(0.000)	
Board Independence $_{t-1}$	-0.011***	-0.052***
	(0.000)	
CEO Duality $_{t-1}$	0.001***	0.001***
	(0.000)	
Board Age$_{t-1}$	-0.001***	-0.003***
	(0.000)	
Board Size $_{t-1}$	-0.003***	-0.013***
	(0.000)	
Tangibility $_{t-1}$	0.190***	0.867***
	(0.003)	
NPL $_{t-1}$	0.020***	0.093***
	(0.001)	
Non-Interest Income $_{t-1}$	0.002***	0.008***
	(0.000)	
ROA $_{t-1}$	-0.117***	-0.533***
	(0.002)	
Dividends $_{t-1}$	-0.179***	-0.817***
	(0.012)	
Growth Opportunities $_{t-1}$	0.001***	0.004***
	(0.000)	
Size $_{t-1}$	-0.002***	-0.007***
	(0.000)	
Ratings $_{t-1}$	-0.000*	-0.001*
	(0.001)	
Analysts $_{t-1}$	0.002	0.007
	(0.002)	
Institutional Ownership $_{t-1}$	-0.005***	-0.022***
	(0.000)	

Table 3: Financial Expertise and the Target Capital Ratio (Continued)

	Coefficients for the Observed Capital Ratio	Coefficients for the Target Ratio
Panel A: Regression Results	(1)	(2)
TARP Bank $_{t-1}$	0.005***	0.023***
	(0.000)	
Effective Tax Rate $_{t-1}$	-0.007*	-0.034*
	(0.000)	
Observations	4,047	
Bank Fixed Effects	Yes	
Year Fixed Effects	Yes	
Number of Instruments	152	
m_2 (P-value)	0.300	
Hansen (P-Value)	0.391	

Panel B: Target Capital and Deviation from the Target						
	N	Mean	Median	SD	p1	p99
Target Capital Ratio (Full Sample)	4,047	0.101	0.100	0.028	0.047	0.172
Deviation from the Target (DIFF):						
Full Sample	4,047	0.002	0.004	0.041	-0.126	0.091
Below Target Banks	2,381	0.028	0.022	0.027	0.001	0.115
Above Target Banks	1,666	-0.030	-0.022	0.032	-0.169	-0.000

Table 4: Financial Expertise and the Speed of Adjustment

This table reports the results of the variable speed of adjustment equation described in section 3.2. We estimate all models via pooled OLS regressions. The models in columns (1), (2) and (3) present the estimates for the full sample and for the banks which are below and above the target capital ratios, respectively. Columns (4) and (5) provide evidence of whether the banks' adjustment mechanisms vary in extreme quintiles of the capital ratio deviation (**$\widehat{DIFF}$**). Quintile 1 (Q1) corresponds with the extremely "overcapitalized" banks (column (5)) (i.e. largest negative DIFF). Whereas banks in quintile 4 (Q4) are the extremely "undercapitalized" (i.e. largest positive DIFF) (column (4)). **Financial Expertise** is the ratio between the number of independent financial expert directors and the total number of non-financial expert independent directors, **CEO Duality** is a dummy variable equal to 1 if the CEO is also the chairman of the board. **Board Independence** is the ratio between the number of independent directors and the total board member, **Board Age** is the log of the average age of directors on the board, **Board Size** is the log of the total number of directors on the board, **Tangibility** is the ratio between fixed to total assets, **NPL** is the ratio of non-performing loans to net loans, **Non-Interest Income** is the ratio of non-interest income to non-interest income plus net interest income, **ROA** is the ratio between earnings before interest and tax and total assets, **Dividends** is the ratio of dividends to total assets, **Growth Opportunities** is the ratio between market and book value of assets, **Size** is the log of total assets measured in millions of US dollars, **Ratings** is the S&P credit ratings ranging from 1 to 9 (1= D and 9 = A+), **Analysts** is the log of the number of analysts, **Institutional Ownership** is total institutional ownership (% of Shares Outstanding), **TARP Bank** is a Dummy variable equal to 1 for the years during which a bank remained under the TARP program, **Effective Tax Rate** is the ratio between total income tax paid and total income before tax. **$\widehat{DIFF}$** is the difference between the estimated target capital ratio and the lag value of the capital ratio. Robust standard errors, clustered at the bank level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Full Sample	**Banks Below Target**	**Banks Above Target**	**Extremely "Undercapitalised" Banks**	**Extremely "Overcapitalised" Banks**
	(1)	(2)	(3)	(4)	(5)
Panel A: Determinants of the Speed of Adjustment					
Financial Expertise $_{t-1}$	0.011***	0.024***	-0.003	0.026***	-0.006
	(0.003)	(0.005)	(0.006)	(0.004)	(0.007)
Board Independence $_{t-1}$	-0.180*	-0.142*	0.357***	-0.140**	0.351***
	(0.089)	(0.076)	(0.088)	(0.063)	(0.099)
CEO Duality $_{t-1}$	-0.074***	-0.015	-0.014	-0.024	-0.026
	(0.024)	(0.025)	(0.026)	(0.033)	(0.027)
Board Age$_{t-1}$	0.010***	-0.001	0.005	-0.001	0.004
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)
Board Size $_{t-1}$	0.012	-0.032	-0.049	-0.023	-0.044
	(0.047)	(0.047)	(0.048)	(0.062)	(0.055)
Tangibility $_{t-1}$	-2.128***	0.022	0.522	0.653	-0.410
	(0.818)	(0.779)	(1.342)	(0.870)	(1.403)
NPL $_{t-1}$	-0.711	0.037	-1.593***	0.141	-1.651***
	(0.614)	(0.484)	(0.547)	(0.707)	(0.576)
Non-Interest Income $_{t-1}$	-0.133	0.086	-0.335**	0.096	-0.336**
	(0.101)	(0.090)	(0.163)	(0.104)	(0.168)
ROA $_{t-1}$	10.415***	1.234	8.356***	0.547	9.205***
	(2.108)	(1.220)	(2.180)	(1.551)	(2.273)

Table 4: Financial Expertise and the Speed of Adjustment (Continued)

	Full Sample	Banks Below Target	Banks Above Target	Extremely "Undercapitalised" Banks	Extremely "Overcapitalised" Banks
	(1)	(2)	(3)	(4)	(5)
Dividend to Assets $_{t-1}$	-4.837	-12.025**	7.479	-10.385***	4.622
	(4.015)	(4.715)	(5.309)	(4.472)	(5.615)
Growth Opportunities $_{t-1}$	0.002*	0.002***	-0.059***	0.002**	-0.054**
	(0.001)	(0.001)	(0.023)	(0.001)	(0.027)
Size $_{t-1}$	-0.013	0.036**	-0.056***	0.028***	-0.044**
	(0.028)	(0.017)	(0.019)	(0.004)	(0.019)
Ratings $_{t-1}$	0.028***	-0.001	0.025***	0.008	0.026***
	(0.004)	(0.007)	(0.006)	(0.009)	(0.006)
Analysts $_{t-1}$	-0.032	-0.008	-0.026	-0.001	-0.031
	(0.045)	(0.020)	(0.024)	(0.023)	(0.025)
Institutional Ownership $_{t-1}$	0.243***	-0.059	0.418***	-0.054	0.405***
	(0.070)	(0.054)	(0.090)	(0.064)	(0.091)
TARP Bank $_{t-1}$	-0.276***	-0.032	-0.444***	-0.035	-0.443***
	(0.048)	(0.028)	(0.068)	(0.034)	(0.069)
Effective Tax Rate $_{t-1}$	-0.142	-0.187**	0.143	-0.099*	0.047
	(0.134)	(0.108)	(0.229)	(0.045)	(0.238)
$\widehat{DIFF}_{i,t-1}$	1.319***	1.474	0.523**	1.564	0.509***
	(0.201)	(0.992)	(0.205)	(1.025)	(0.200)
Constant	-0.001	0.002*	-0.001	0.000	-0.000
	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)
Observations	4,047	2,381	1,666	1,011	1,012
R-squared	0.558	0.094	0.786	0.144	0.834
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Panel B: Marginal Effect of DIFF					
Average Speed of Adjustment	0.209***	0.208***	0.192***	0.347***	0.210***

Table 5: Controlling for Endogeneity – 2SLS Estimation and Difference-in-Differences Analysis

This table reports the results of the impact of financial and non-financial independent directors on bank capital using an instrumental variable approach (Panel A) and difference-in-differences approach based on the Dodd- Frank Act 2010 (Panel B). In Panel A, we present the first stage results for banks below and (above) target capital in columns (1), (2), and (4) and (5), respectively. Columns (3) and (6) report results for banks below and above the target ratio from the second stage regression of the variable speed of adjustment model. **Board Independence to State** is an instrumental variable calculated as the average board independence of non-financial firms at the state level. **Financial Expertise to State** is an instrumental variable calculated as the average of financial expert directors on non-financial firms' boards at the state level. **Board Independence** is the ratio between the number of independent directors and total number of board members, **Financial Expertise** is the ratio between the number of independent financial expert directors and the total number of non-financial independent directors. In Panel B we estimate the difference-in-differences model over the period 2008-2014. **Post** is a dummy variable that takes on a value of one for the time period 2011-2014 comprising the announcement and implementation of the reforms. **Treated** is a dummy variable that takes on a value of one for banks that had a risk committee and hired at least one financial expert director on board after the implementation of the Act. $\widehat{\mathbf{DIFF}}_{t-1}$ is the difference between the estimated target and the lag value of the capital ratio. All models include the set of control variables as of Table 3. Robust standard errors, clustered at the bank level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Banks Below Target			**Banks Above Target**		
	2SLS Stage 1		2SLS Stage 2	2SLS Stage 1		2SLS Stage 2
	Board Independence	Financial Expertise	Determinants of Speed of Adjustment	Board Independence	Financial Expertise	Determinants of Speed of Adjustment
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: 2SLS						
Board Independence to State $_{t-1}$	0.009***			0.003***		
	(0.003)			(0.000)		
Financial Expertise to State $_{t-1}$	0.004	0.031**		-0.007	0.049**	
	(0.007)	(0.014)		(0.013)	(0.020)	
Board Independence $_{t-1}$			-0.530**			2.506***
			(0.260)			(0.499)
Financial Expertise $_{t-1}$			0.101***			-3.167**
			(0.030)			(0.872)
Observations	2,128	2,128	2,128	1,919	1,919	1,919
R-squared	0.237	0.047	0.184	0.130	0.040	0.188
Year Fixed Effects & Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
First Stage F-Statistics	403.81***	431.10***		401.00***	441.10***	

Table 5 (Continued)

	Coefficients for the Observed Capital Ratio	Coefficients for the Target Ratio	Speed of Adjustment	
			Below Target	Above Target
	(1)	(2)	(3)	(4)
Panel B: Difference-in-Differences Analysis				
$Equity_{t-1}$	0.614***			
	(0.001)			
$Post_t \times Treated_i$	0.007***	0.018***	0.137***	-0.125***
	(0.000)		(0.015)	(0.041)
$\widehat{DIFF}_{i,t-1}$			-0.491	-0.646
			(0.466)	(0.405)
Observations	251		188	63
R-squared			0.286	0.823
Bank Fixed Effects	Yes			
m2 (P-value)	0.300			
Hansen (P-Value)	0.391			
Year Fixed Effects	Yes		Yes	Yes

Table 6: The Importance of Director Financial Skills – Additional Evidence

This table reports additional results on the importance of director financial skills for bank capital management. Panel A reports estimates on the impact of the combination between financial education and financial working experience among financial expert directors. Panel B reports estimates on how audit committee experience by financial expert directors influences our findings. We use a partial adjustment model to estimate the determinants of the capital ratio under a constant adjustment speed framework in Column (1). Column (2) presents estimates of the coefficients for the target ratio. Models from columns (3) to (6) are estimated via pooled OLS regressions. More precisely, the models in columns (3) and (4) present the estimates for the banks which are below and above the target capital ratio, respectively. Columns (5) and (6) provide evidence of whether the banks' adjustment mechanisms vary in the extreme quintiles of the capital ratio deviation (DIFF). Quintile 1 (Q1) corresponds with the most overcapitalized banks (column (6)) (i.e. largest negative gap), whereas banks in quintile 4 (Q4) are the most undercapitalized (i.e. largest positive DIFF) (column (5)). **Equity**$_{t-1}$ is the lagged dependent variable calculated as total equity divided by total assets. **Financial Expertise** is the ratio between the number of independent financial expert directors and the total number of non-financial expert independent directors, **Board Independence** is the ratio between the number of independent directors and total number of board members. **Skill Range** is the log of the number of independent directors with a finance degree and who also have financial working experience. **Audit Committee Experience** is the log of the number of financial expert directors with past audit committee experience in the financial sector. $\widehat{DIFF}$ is the difference between the estimated target and the lag value of the capital ratio. The equality test shows the p- values of a χ^2 test of statistical equality of the coefficients of the variable 3 and 4 of each panel. All models include the set of control variables as of Table 3. Robust standard errors, clustered at the bank level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

			Speed of Adjustment			
	Coefficients for the Observed Capital Ratio	**Coefficients for the Target Ratio**	**Banks Below Target**	**Banks Above Target**	**Extremely "Undercapitalised" Banks**	**Extremely "Overcapitalised" Banks**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Skill Range - Financial Education combined with Financial Experience						
Equity $_{t-1}$	0.489***					
	(0.001)					
Financial Expertise $_{t-1}$	0.003***	0.005***	0.050***	-0.064*	0.056***	-0.046
	(0.000)		(0.003)	(0.036)	(0.039)	(0.045)
Board Independence $_{t-1}$	-0.048***	-0.093***	-0.352***	1.030***	-0.277***	0.963***
	(0.000)		(0.127)	(0.112)	(0.041)	(0.164)
Financial Education $_{t-1}$	0.003***	0.005**	0.028***	-0.033***	0.022***	-0.066
	(0.000)		(0.008)	(0.012)	(0.010)	(0.089)
Financial Expertise $_{t-1}$ × Skill Range $_{t-1}$	0.005***	0.009***	0.034***	-0.073***	0.038***	-0.086***
	(0.000)		(0.009)	(0.006)	(0.016)	(0.008)
$\widehat{DIFF}_{i,t-1}$			-0.180	-1.388***	-0.147	-1.496***
			(0.204)	(0.177)	(0.227)	(0.287)
Observations	3,571		1,624	1,947	892	893
R-squared			0.197	0.785	0.244	0.856
m2 (P-value)	0.310					
Hansen (P-Value)	0.300					
Bank Fixed Effects	Yes					
Year Fixed Effects & Control Variables	Yes		Yes	Yes	Yes	Yes

Table 6 (Continued)

	Coefficients for the Observed Capital Ratio	Coefficients for the Target Ratio	Speed of Adjustment			
			Banks Below Target	Banks Above Target	Extremely "Undercapitalised" Banks	Extremely "Overcapitalised" Banks
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: Skill Range - Past Audit Committee Experience						
Equity $_{t-1}$	0.857***					
	(0.005)					
Financial Expertise $_{t-1}$	0.024***	0.167***	0.040***	-0.046	0.083***	-0.077
	(0.001)		(0.010)	(0.094)	(0.014)	(0.089)
Board Independence $_{t-1}$	-0.035***	-0.244**	-0.129***	0.816***	-0.232***	0.814***
	(0.002)		(0.048)	(0.216)	(0.056)	(0.188)
Financial Education $_{t-1}$	0.002***	0.014***	0.016***	-0.003	0.042***	-0.022
	(0.000)		(0.014)	(0.002)	(0.015)	(0.018)
Financial Expertise $_{t-1}$ × Audit Committee Experience $_{t-1}$	0.015***	0.104***	0.027***	-0.008***	0.055***	-0.027***
	(0.001)		(0.009)	(0.000)	(0.011)	(0.087)
$\widehat{DIFF}_{i,t-1}$			0.005	-1.123***	0.116	-1.506***
			(0.068)	(0.264)	(0.078)	(0.281)
Observations	3,936		1,875	2,061	984	984
R-squared			0.174	0.814	0.243	0.877
m2 (P-value)	0.384					
Hansen (P-Value)	0.300					
Bank Fixed Effects	Yes					
Year Fixed Effects & Control Variables	Yes		Yes	Yes	Yes	Yes

Table 7: Financial Expertise and Bank Level Risk and Aggregate Systemic Risk - Target Capital and Speed of Adjustment

This table reports the results of the target capital equation and the variable speed of adjustment equation when we interact financial expertise with risk measures. We employ non-performing loans (Panel A) as a measure of portfolio risk and CATFIN (Panel B) as a measure of aggregate systemic risk. We use a partial adjustment model to estimate the determinants of the target capital ratio under a constant adjustment speed framework in Column (1). Column (2) presents estimates of the coefficients for the target ratio. Models from columns (3), to (6) are estimated via pooled OLS regressions. More precisely, the models in columns (3) and (4) present the estimates for the banks which are below and above the target capital ratio, respectively. Columns (5) and (6) provide evidence of whether the banks' adjustment mechanisms vary in extreme quintiles of the capital ratio deviation (DIFF). Quintile 1 (Q1) includes the most "overcapitalized" banks (column (6)) (i.e. largest negative DIFF). Whereas banks in quintile 4 (Q4) are the most "undercapitalized" (i.e. largest positive DIFF) (column (5)). **Financial Expertise** is the ratio between the number of independent financial expert directors and the number of non-financial independent directors, **Board Independence** is the ratio between the number of independent directors and the total board member, **NPL** is the ratio of non-performing loans to net loans. **CATFIN** the measure of aggregate systemic risk. $\widehat{\textbf{DIFF}}$ is the difference between the estimated target and the lag value of the capital ratio. All models include the set of control variables as of Table 3. Robust standard errors, clustered at the bank level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

			Speed of Adjustment			
	Coefficients for the Observed Capital Ratio	**Coefficients for the Target Ratio**	**Banks Below Target**	**Banks Above Target**	**Extremely "Undercapitalised" Banks**	**Extremely "Overcapitalised" Banks**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Non-Performing Loans						
Equity $_{t-1}$	0.633***					
	(0.001)					
Financial Expertise $_{t-1}$	0.002***	0.005***	0.017**	-0.027	0.007**	-0.029
	(0.000)		(0.008)	(0.031)	(0.003)	(0.040)
Board Independence $_{t-1}$	-0.008***	-0.022***	-0.296***	0.260***	-0.324***	0.349***
	(0.000)		(0.101)	(0.070)	(0.115)	(0.096)
NPL $_{t-1}$	0.098***	0.267***	-3.104	-0.822**	-3.111	-0.952**
	(0.000)		(2.690)	(0.327)	(1.775)	(0.407)
Financial Expertise $_{t-1}$ × NPL $_{t-1}$	0.125***	0.340***	2.292**	-0.162	2.370**	-0.017
	(0.001)		(0.990)	(0.629)	(1.096)	(0.786)
$\widehat{DIFF}_{i,t-1}$			0.247	-0.328**	-0.255	-0.325*
			(0.204)	(0.155)	(0.325)	(0.197)
Observations	4,047		1,656	2,391	1,011	1,012
R-squared			0.164	0.745	0.206	0.830
m2 (P-value)	0.411					
Hansen (P-Value)	0.399					
Bank Fixed Effects	Yes					
Year Fixed Effects & Control Variables	Yes		Yes	Yes	Yes	Yes

Table 7 (Continued)

			Speed of Adjustment			
	Coefficients for the Observed Capital Ratio	**Coefficients for the Target Ratio**	**Banks Below Target**	**Banks Above Target**	**Extremely "Undercapitalised" Banks**	**Extremely "Overcapitalised" Banks**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: CATFIN						
Equity $_{t-1}$	0.867***					
	(0.001)					
Financial Expertise $_{t-1}$	0.004***	0.003***	0.018***	-0.064*	0.003***	-0.033
	(0.000)		(0.011)	(0.048)	(0.001)	(0.064)
Board Independence $_{t-1}$	-0.011***	-0.082***	-0.151***	0.315***	-0.136***	0.283***
	(0.000)		(0.017)	(0.054)	(0.002)	(0.069)
CATFIN $_{t-1}$	-0.013***	0.097***	0.395*	0.094	0.507**	-0.278
	(0.000)		(0.219)	(0.077)	(0.244)	(0.335)
Financial Expertise $_{t-1}$ × CATFIN $_{t-1}$	0.002***	0.015***	0.318***	-0.009***	0.385***	-0.086***
	(0.000)		(0.109)	(0.003)	(0.041)	(0.019)
$\widehat{DIFF}_{i,t-1}$			1.310*	-0.241	0.140	0.221*
			(0.651)	(0.210)	(0.010)	(0.109)
Observations	4,047		1,424	2,623	1,011	1,012
R-squared			0.076	0.671	0.088	0.791
m2 (P-value)	0.406					
Hansen (P-Value)	0.401					
Bank Fixed Effects	Yes					
Year Fixed Effects & Control Variables	Yes		Yes	Yes	Yes	Yes

Table 8: Financial Expertise and Adjustment Strategies

This table reports the estimates of the determinants of the sources of adjustment towards the target ratio. We explore two major sources of adjustment: i) equity adjustments in columns (1) and (2) and ii) asset adjustments in columns (3) and (4). **ΔEquity** is the annual change in equity (minus net income, retained earnings and accumulated earnings) divided by average assets. **ΔRetained Earnings** is the annual change in the retained earnings divided by average assets. **ΔSecurities** is the annual change in other earning assets divided by average assets. **ΔLoans** is the annual change in net loans divided by average assets. **Deficit** is the absolute value of the difference between the target and actual capital ratio if the bank is below its target, otherwise, it is equal to 0. **Surplus** is the absolute value of the difference between the target and actual capital ratio if the bank is above its target, otherwise, it is equal to 0. **Financial Expertise** is the ratio between the number of independent financial expert directors and the total number of non-financial expert independent directors. **Board Independence** is the ratio between the number of independent directors and the total number of board members, The model is estimated using the System GMM specification described in section 3.2. All models include the set of control variables as of Table 3. Robust standard errors, clustered at the bank level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Equity Adjustment		**Asset Adjustment**	
	Δ Equity	**Δ Retained Earnings**	**Δ Securities**	**Δ Loans**
	(1)	(2)	(3)	(4)
Panel A: Interaction with Financial Expertise				
Financial Expertise $_{t-1}$	0.048***	-0.242***	0.011***	-0.005***
	(0.001)	(0.002)	(0.000)	(0.000)
Board Independence $_{t-1}$	-0.157***	1.518	0.014	0.033***
	(0.013)	(1.029)	(0.014)	(0.003)
Deficit $_{t-1}$	0.695***	0.055***	-0.979***	-0.501***
	(0.105)	(0.003)	(0.030)	(0.022)
Surplus $_{t-1}$	-3.760***	-0.013***	0.447***	-0.185
	(0.113)	(0.136)	(0.030)	(1.023)
Deficit $_{t-1}$ × Financial Expertise $_{t-1}$	2.128***	-13.579	-0.273***	0.307
	(0.027)	(10.077)	(0.008)	(0.305)
Surplus $_{t-1}$ × Financial Expertise $_{t-1}$	1.313	-2.792***	0.209***	0.018***
	(1.032)	(0.046)	(0.009)	(0.006)
Observations	4,047	4,047	4,047	4,047
m2 (p-value)	0.191	0.250	0.301	0.278
Hansen (p-value)	0.317	0.384	0.300	0.470
Bank Fixed Effects	Yes			
Year Fixed Effects & Control Variables	Yes	Yes	Yes	Yes

Table 8 (Continued)

	Equity Adjustment		Asset Adjustment	
	Δ Equity	**Δ Retained Earnings**	**Δ Securities**	**Δ Loans**
	(1)	(2)	(3)	(4)
Panel B: Interaction with Financial Expertise and Board Independence				
Financial Expertise $_{t-1}$	0.050***	-0.202***	0.012**	-0.006***
	(0.001)	(0.002)	(0.005)	(0.000)
Board Independence $_{t-1}$	-0.228***	0.809	0.060	0.073***
	(0.021)	(0.733)	(0.066)	(0.003)
Deficit $_{t-1}$	0.724**	0.082***	-0.286***	-0.808*
	(0.360)	(0.035)	(0.074)	(0.403)
Surplus $_{t-1}$	-0.900***	-0.792***	1.630***	0.157
	(0.440)	(0.014)	(0.130)	(0.098)
Deficit $_{t-1}$ × Financial Expertise $_{t-1}$	2.266***	-12.567	-0.285***	0.291
	(0.019)	(16.074)	(0.008)	(0.305)
Deficit $_{t-1}$ × Board Independence $_{t-1}$	1.497	0.536***	-2.608***	2.811***
	(1.344)	(0.204)	(0.134)	(0.079)
Surplus $_{t-1}$ × Financial Expertise $_{t-1}$	1.349	-2.318***	0.200***	0.045***
	(1.523)	(0.042)	(0.006)	(0.006)
Surplus $_{t-1}$ × Board Independence$_{t-1}$	-8.745***	-2.485**	1.652	0.329***
	(0.845)	(1.202)	(1.172)	(0.123)
Observations	4,047	4,047	4,047	4,047
m2 (p-value)	0.195	0.380	0.317	0.278
Hansen (p-value)	0.317	0.384	0.300	0.470
Bank Fixed Effects	Yes			
Year Fixed Effects & Control Variables	Yes	Yes	Yes	Yes

Table 9: The Importance of the Skin-in-the-Game of Financial Expert Directors

This table shows the results on the influence of the skin-in-the-game of financial expertise on bank capital dynamics. Panel A focuses on potential wealth losses suffered by financial expert directors in the case of a bank failure, whereas Panels B focuses on losses related to the directorship labour market. We use a partial adjustment model to estimate the determinants of the target capital ratio under a constant adjustment speed framework in Column (1). Column (2) presents estimates of the coefficients for the target ratio. Models from columns (3) to (6) are estimated via pooled OLS regressions. More precisely, models in columns (3) and (4) present the estimates for the banks which are below and above the target capital ratio, respectively. Columns (5) and (6) provide evidence of whether the banks' adjustment mechanisms vary in the extreme quintiles of the capital ratio deviation (DIFF). Quintile 1 (Q1) corresponds with the most "overcapitalized" banks (column (6)) (i.e. largest negative DIFF), whereas banks in quintile 4 (Q4) are the most "undercapitalized" (i.e. largest positive DIFF) (column (5)). **Equity**$_{t-1}$ is the lagged dependent variable calculated as total equity divided by total assets. **Financial Expertise** is the ratio between the number of independent financial expert directors and the total number of non-financial expert independent directors, **Board Independence** is the ratio between the number of independent directors and the total number of board members, **Financial Experts Currently Working in the Financial Sector** is the log of number of financial expert directors currently working in a financial sector. **Financial Firm Directorships** is the log of the number of financial firm directorships held by financial expert directors. $\widehat{DIFF}$ is the difference between the estimated target and the lag value of the capital ratio. The equality test shows the p-values of a χ^2 test of statistical equality of the estimated coefficients for different types of financial expert directors. All models include the set of control variables as of Table 3. Robust standard errors, clustered at the bank level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

			Speed of Adjustment			
	Coefficients for the Observed Capital Ratio	**Coefficients for the Target Ratio**	**Banks Below Target**	**Banks Above Target**	**Extremely "Undercapitalised" Banks**	**Extremely "Overcapitalised" Banks**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Exposure to Wealth Losses						
Equity $_{t-1}$	0.684***					
	(0.001)					
Financial Expertise $_{t-1}$	0.006***	0.019***	0.145***	-0.006	0.070***	0.001
	(0.000)		(0.048)	(0.013)	(0.020)	(0.024)
Board Independence $_{t-1}$	-0.022***	-0.070***	-0.836**	0.339***	-0.030**	0.345***
	(0.000)		(0.418)	(0.033)	(0.013)	(0.126)
Financial Experts Currently Working in the Financial Sector $_{t-1}$	0.002***	0.006***	0.601*	0.017	0.030**	0.011
	(0.000)		(0.295)	(0.011)	(0.013)	(0.019)
Financial Expertise $_{t-1}$ × Financial Experts Currently Working in the Financial Sector $_{t-1}$	0.007***	0.022***	0.437***	-0.007	0.119***	0.005
	(0.000)		(0.036)	(0.028)	(0.053)	(0.051)
$\widehat{DIFF}_{i,t-1}$			-0.302	-0.454***	0.404*	-0.504***
			(1.301)	(0.057)	(0.225)	(0.151)
Observations	4,047		2,540	1,507	1,011	1,012
R-squared			0.887	0.637	0.196	0.821
m2 (P-value)	0.374					
Hansen (P-Value)	0.300					
Bank Fixed Effects	Yes					
Year Fixed Effects & Control Variables	Yes		Yes	Yes	Yes	Yes

Table 9 (Continued)

			Speed of Adjustment			
	Coefficients for the Observed Capital Ratio	**Coefficients for the Target Ratio**	**Banks Below Target**	**Banks Above Target**	**Extremely "Undercapitalised" Banks**	**Extremely "Overcapitalised" Banks**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B : Exposure to Directorship Losses						
Equity $_{t-1}$	0.670***					
	(0.002)					
Financial Expertise $_{t-1}$	0.005***	0.015***	0.057***	0.039	0.056***	0.040
	(0.000)		(0.005)	(0.028)	(0.017)	(0.034)
Board Independence $_{t-1}$	-0.012***	-0.037***	-0.119**	0.580***	-0.120**	0.515***
	(0.001)		(0.055)	(0.065)	(0.117)	(0.115)
Financial Firm Directorships $_{t-1}$	0.001**	0.003**	0.002**	-0.000	0.002	-0.001
	(0.000)		(0.001)	(0.001)	(0.002)	(0.002)
Financial Expertise $_{t-1}$ × Financial Firm Directorships $_{t-1}$	0.008***	0.024***	0.061***	-0.079*	0.062***	-0.133*
	(0.000)		(0.044)	(0.037)	(0.003)	(0.079)
$\widehat{DIFF}_{i,t-1}$			-0.281*	-0.595***	-0.298	-0.708***
			(0.159)	(0.108)	(0.219)	(0.179)
Observations	3,936		2,810	1,126	984	984
R-squared			0.196	0.803	0.205	0.886
m2 (P-value)	0.313					
Hansen (P-Value)	0.330					
Bank Fixed Effects	Yes					
Year Fixed Effects & Control Variables	Yes		Yes	Yes	Yes	Yes

Table 10: Board Composition and Supervisory Attention - Target Capital and Speed of Adjustment

This table reports estimates on how the impact of independent directors' financial expertise on the capital ratio and the speed of adjustment varies with regulatory scrutiny. Panel A reports results for the impact of supervisory attention on the bank target capital ratio and its speed of adjustment. The results for the capital equation are presented in column (1). A partial adjustment model has been used to produce the estimates of the determinants of equity capital ratio under a constant adjustment speed framework. Column (2) presents estimates of the coefficients for the target ratio. All models in columns (3) and (4) represent the estimates of the variable speed of adjustment model and are estimated using a pooled OLS regression. **Supervisory Attention** is a dummy variable that takes the value of one in each year for the top 5 largest BHCs in each federal district. **Financial Expertise** is the ratio between the number of independent financial expert directors and the number of non-financial independent directors. **Board Independence** is the ratio between the number of independent directors and the total number of board members. $\widehat{\mathbf{DIFF}}$ is the difference between the estimated target and the lag value of the capital ratio. All models include the set of control variables as of Table 3. Robust standard errors, clustered at the bank level, are reported in parentheses. Panel B reports marginal effects. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

			Speed of Adjustment	
	Coefficients for the Observed Capital Ratio	**Coefficients for the Target Ratio**	**Banks Below Target**	**Banks Above Target**
	(1)	(2)	(3)	(4)
Panel A: Regression Analysis				
β_0Equity $_{t-1}$	0.807***			
	(0.001)			
β_1Financial Expertise $_{t-1}$	0.005***	0.025***	0.187***	-0.014
	(0.000)		(0.055)	(0.028)
β_2Board Independence $_{t-1}$	-0.004***	-0.020***	-0.084**	0.177**
	(0.000)		(0.040)	(0.081)
β_3 Supervisory Attention $_{t-1}$	0.003***	0.015***	0.353	-0.061
	(0.000)		(0.188)	(0.047)
β_4Financial Expertise $_{t-1}$× Supervisory Attention $_{t-1}$	0.006***	0.031***	0.384**	-0.033
	(0.000)		(0.157)	(0.104)
$\widehat{DIFF}_{i,t-1}$			0.315***	0.213***
			(0.030)	(0.058)
Observations	4,047		2,034	2,013
R-squared			0.121	0.233
m2 (P-value)	0.311			
Hansen (P-Value)	0.306			
Bank Fixed Effects	Yes			
Control Variables & Time Fixed Effects	Yes		Yes	Yes
Panel B: Marginal Effects				
Financial Expertise				
β_1 Low Supervisory Attention	0.005***		0.187***	-0.014
$\beta_1 + \beta_4$ High Supervisory Attention	0.011***		0.571***	-0.047

Table 11: Financial Expertise and Increase in Regulatory Scrutiny Induced by the Dodd-Frank Act - Target Capital and Speed of Adjustment

This table reports estimates on the impact of an increase in regulatory scrutiny measured via the Dodd-Frank Act 2010 on how financial expertise influences the target capital ratio and speed of adjustment. we estimate the difference-in-differences model over the period 2008-2014. The target capital estimates are presented in column (1). **Post** is a dummy variable that takes the value of one for the years 2011 – 2014. **Treat** is a dummy variable that takes the value of one when a bank has an asset value between $10 billion and $20 billion and remains zero for banks with assets between $1 billion and $7 billion. **Financial Expertise** is the ratio between the number of independent financial expert directors and the total number of non-financial independent directors. **Board Independence** is the ratio between the total number of independent directors and board size, $\widehat{\mathbf{DIFF}}$ is the difference between the estimated target and the lag value of the capital ratio. All models include the set of control variables as of Table 3. Robust standard errors, clustered at the bank level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

			Speed of Adjustment	
	Coefficients for the Observed Capital Ratio	**Coefficients for the Target Ratio**	**Banks Below Target**	**Banks Above Target**
	(1)	(2)	(3)	(4)
β_0Equity $_{t-1}$	0.771***			
	(0.002)			
β_1Financial Expertise $_{t-1}$	0.003***	0.013***	0.005***	-0.039
	(0.000)		(0.001)	(0.051)
β_2Board Independence $_{t-1}$	-0.013***	-0.056***	-0.248*	0.136***
	(0.000)		(0.132)	(0.034)
β_3Post $_t$ ×Treated $_i$	0.003***	0.013***	0.124*	0.141**
	(0.000)		(0.062)	(0.069)
β_4Financial Expertise $_{t-1}$ × Post$_t$	-0.004	-0.017	-0.007	-0.078
	(0.004)		(0.059)	(0.071)
β_5Financial Expertise $_{t-1}$ × Treated $_i$	0.001**	0.004**	-0.143	-0.254
	(0.000)		(0.170)	(0.247)
β_6Financial Expertise $_{t-1}$× Post $_t$× Treated $_i$	0.016***	0.069***	0.233***	0.080
	(0.000)		(0.098)	(0.381)
β_7 Treated $_i$			0.001	0.001
			(0.001)	(0.002)
$\widehat{DIFF}_{i,t-1}$			-9.612***	6.535***
			(1.190)	(1.190)
Observations	1,918		998	920
R-squared			0.167	0.269
m2 (P-value)	0.354			
Hansen (P-Value)	0.416			
Bank Fixed Effects	Yes			
Year Fixed Effects & Control Variables	Yes		Yes	Yes

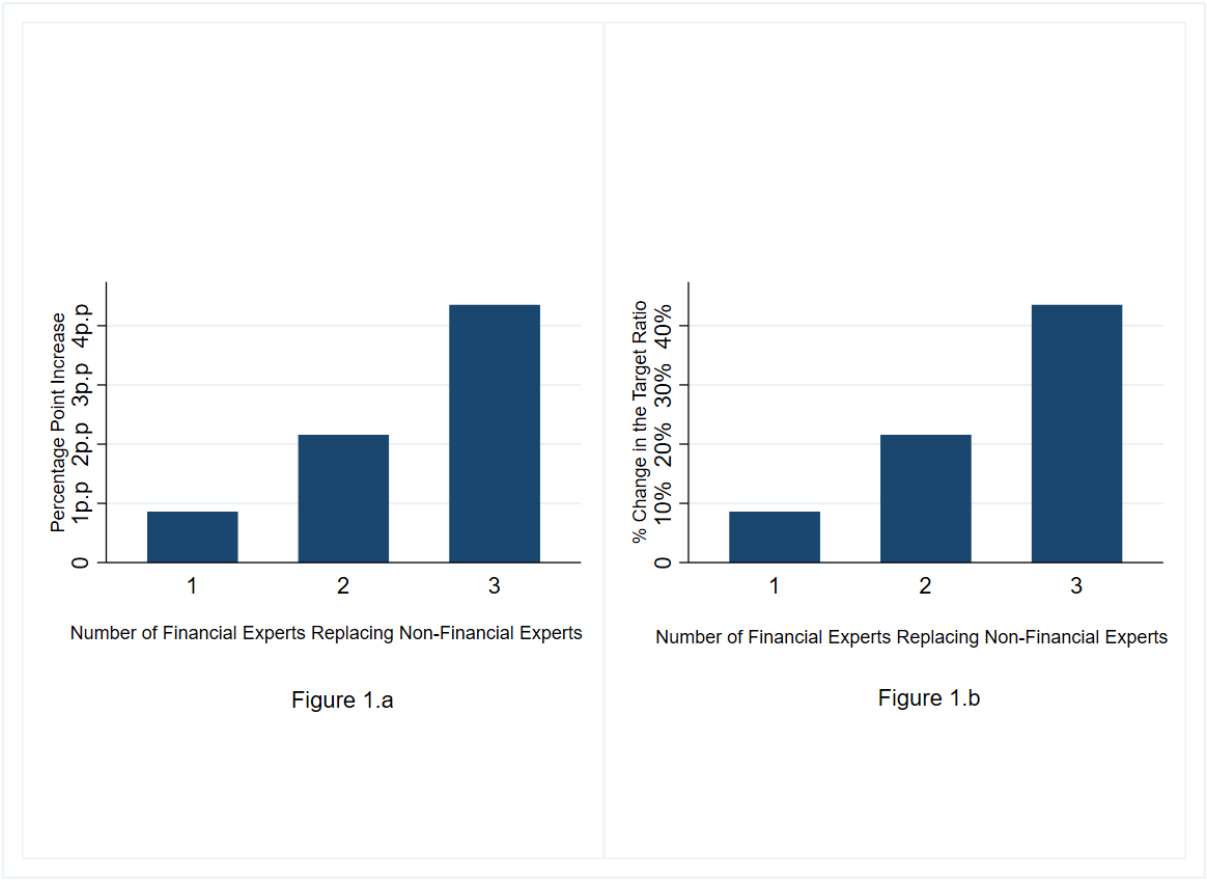

Figure 1: The Economic Impact of Financial Experts on Target Capital

This figure reports the percentage point increase (1.a) and % change (1.b) in the Target capital ratio with a replacement of each non-financial director with a financial expert director on the board.

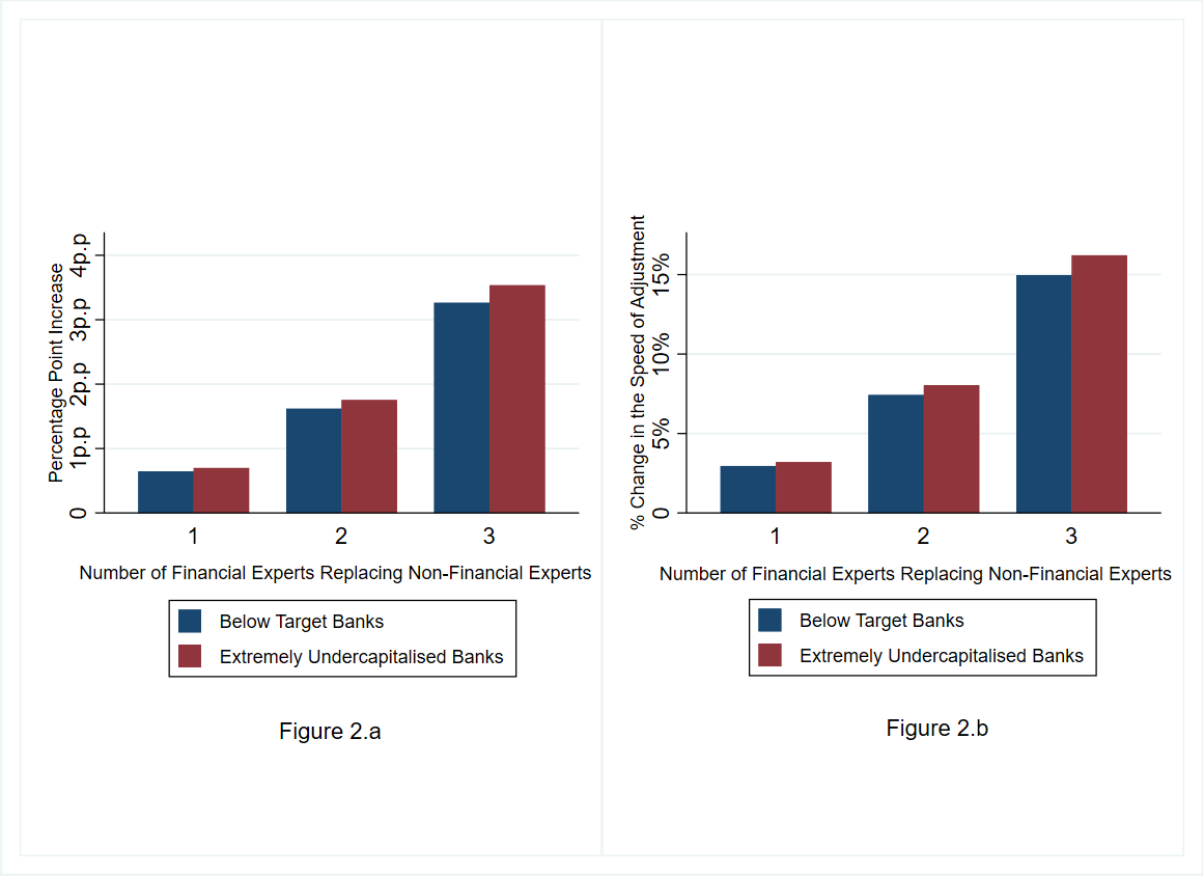

Figure 2: The Economic Impact of Financial Experts on the Speed of Adjustment

This figure reports the percentage point increase (2.a) and % change (2.b) in the speed of adjustment towards target capital with a replacement of each non-financial director with financial expert director on the board.