Bank institutional setting and risk-taking: The missing role of directors' education and turnover.

Journal:	*Corporate Governance*
Manuscript ID	CG-01-2019-0013.R1
Manuscript Type:	Original Article
Keywords:	Corporate Governance, Cooperative Banks, Bank Ownership, Boards of Directors, Bank Risk

Bank institutional setting and risk-taking: The missing role of directors' education and turnover

ABSTRACT

Purpose

This paper aims to analyze the relationship between bank institutional setting and risk-taking by exploring whether board education and turnover are drivers of the risk propensity of cooperative banks compared to joint-stock banks.

Design/methodology/approach

Based on a comprehensive dataset of Italian banks over the 2011-2017 period, we examine whether these board characteristics affect the risk propensity of cooperative and joint-stock banks. Bank risk is measured by the Z-index, profit volatility and the ratio of non-performing loans to total gross loans.

Findings

The findings show that cooperatives take less risk than joint-stock banks and have lower board turnover and education. Furthermore, we find that while board education mediates the relationship between the cooperative model and bank risk-taking, we do not find evidence of board turnover. Thus, the lower educational level of cooperative directors contributes to explaining the lower risk-taking of cooperative banks.

Implications

The findings have several implications. In terms of the more general policy debate, our results point to the need to strengthen the governance model for both joint-stock and cooperative banks while supporting the view that a more ad hoc perspective on the best models and practices for each type of institutional setting would be preferable. In particular, the study reveals how board education's effects on bank risk-taking should be carefully monitored.

Originality/value

Through a mediation framework, this study provides empirical evidence on the relationship between bank institutional setting (by distinguishing between cooperative and joint-stock banks) and risk-taking behavior by exploring the underlying mechanisms at the board level, which is novel in the literature.

Keywords: Corporate Governance, Cooperative Banks, Bank Ownership, Board of Directors, Bank Risk.

1. Introduction

In the years before the financial crisis, bank risk came under greater scrutiny by regulators, reinvigorating the debate among policy makers and academics regarding best practices in bank risk management and governance. In the banking industry, a crucial role in managing the relationship between risk and governance is assigned to the board of directors. As stated in the corporate governance principles for banks introduced by the Basel Committee on Banking Supervision (2015), "The board is responsible for overseeing a strong risk governance framework, including review of key policies and controls, and should be active when it comes to defining the risk appetite and ensuring alignment thereof within the bank. It should ensure the efficacy of the risk management, compliance and internal audit functions". Since the Basel Committee introduced the prudential capital framework in 1988, the literature on this topic has grown rapidly and in different directions (Anderson & Fraser, 2000; J. H. Boyd & De Nicoló, 2005; Jiménez, Ongena, Peydró, & Saurina, 2014; Saunders, Strock, & Travlos, 1990). More recently, the literature has emphasized the critical role of good corporate governance in banking and revealed how existing regulatory failures could severely impair the stability of the financial system. To reduce those loopholes revealed by the 2007-2008 crisis, regulators at the global level have revised their corporate governance standards in areas related to the board of directors and management compensation. The responses of banks to these initiatives have differed. The most divergence in these reactions is evident between joint-stock banks and cooperative banks. Joint-stock banks and their governance were at the center of the financial crisis, and they are therefore more willing to comply with new standards, whereas cooperative banks argued that they performed better in terms of having lower volatility and more stable returns, as they took less risk during the crisis than joint-stock banks did because of their specific corporate governance characteristics (European Association of Cooperative Banks [EACB], 2015).

While numerous explanations have been invoked for why cooperative banks take less risk, e.g., business model characteristics and ownership structure, to the best of our knowledge, no studies to date have directly

related this difference to bank governance and specifically to board characteristics (Chaddad & Cook, 2004; Fonteyne, 2007; Groeneveld & de Vries, 2009; Hansmann, 2000). By the same token, studies on bank governance and risk-taking have thus far neglected the implications of different institutional settings. Therefore, it is relevant from an academic and policy perspective to explore in greater depth the different roles played by boards of directors in the risk-taking of cooperative banks (Kumar & Zattoni, 2018). To contribute to filling this gap, we add a new dimension to the literature by enhancing the understanding of how board characteristics differently affect the risk-taking of these two types of institutional settings. In line with more recent studies (Baran & Forst, 2015; Pevzner, Xie, & Xin, 2015), we examine this issue using a mediation framework that allows us to investigate the interplay between risk-taking – our outcome variable - and ownership status via the inclusion of a third variable (mediator variable) related to board characteristics.

The empirical literature has mainly analyzed the impact of board structure (in terms of size, gender composition, etc.), directors' independence and compensation packages on firm/bank outcomes (Andres & Vallelado, 2008; Fahlenbrach & Stulz, 2011; Mehran, Morrison, & Shapiro, 2012; Pathan, 2009; Vallascas, Mollah, & Keasey, 2017); to date, the impact of board education and turnover remain less studied (Berger, Kick, & Schaeck, 2014; Minton, Taillard, & Williamson, 2014). These two dimensions, however, play a crucial role in the difference between the governance of joint-stock banks and cooperative banks because of the institutional setting. Therefore, our analysis aims to empirically test whether board education and turnover play a role in explaining the difference between joint-stock and cooperative banks in terms of risk-taking after controlling for other identified drivers of risk-taking and other governance characteristics.

To test our hypotheses, we apply a dynamic panel approach to hand-collected data for a comprehensive sample of 638 Italian banks over the 2011-2017 period. Descriptive analyses reveal a relatively high number of bank directors with low levels of education (proxied by the holding of at least a university degree) in the Italian banking industry (only 39% of board members hold a university degree), especially among cooperative banks (only 23% of cooperative directors hold a university degree). Moreover, we find that cooperatives take less risk than joint-stock banks and that their boards have lower turnover and lower education levels. The mediation analyses reveal that board education mediates the relationship between banks' institutional setting and bank risk, which indicates that cooperative banks take less risk than joint-stock banks because directors of cooperatives are less educated than directors of joint-stock banks. This finding supports the view that less-educated directors tend to assume less risk (Beber & Fabbri, 2012), which leads cooperative banks to be more stable. Notably, our results are valid only for measures of total risk (Z-index and standard deviation of ROA) but not for our proxy of credit risk. Extending the analysis, we test an alternative explanation of credit risk-taking determinants, and we find that small cooperative banks assume less credit risk than large ones. This result suggests that small cooperative banks operating in localized areas have a closer relationship with their customers, so that directors' level of education is probably less relevant than the soft information acquired on the borrowers and the peer monitoring mechanisms. In contrast, our estimations do not support the hypothesis regarding the mediating role of board turnover on the relationship between the bank institutional setting and bank risk.

At the industry level, our investigation aims to add new evidence to the active debate in Europe regarding how institutional differences should be reflected in ad hoc banking regulation and corporate governance standards (European Association of Co-operative Banks, 2015). This debate began soon after the recent financial crisis, as cooperative banks stressed their ability to master the crisis (higher resilience) much better than other banking groups. Write-offs by European cooperative banks (cooperative banks represent 20% of the European banking services market) amounted only to 7% of the write-offs of the whole banking system after the outbreak of the financial crisis. The cooperative banking industry claimed that this outcome was "due to their prudence in dealing with risks and the cooperative ownership and governance model that keep them close to their members and customers" (European Association of Co-operative Banks, 2012).

From an academic perspective, however, this view contrasts with agency theory, which predicts that the weaknesses associated with cooperative banks' ownership structure and the ambiguity of their objectives will lead to poor governance (Borgen, 2004; Hart & Moore, 1998). Our results contribute to both the academic and industry debates showing that one of the weaknesses of their model – the lower level of education of the directors – helps to explain the lower level of risk of cooperatives and thus their better performance in the recent financial crisis.

In terms of the more general policy debate, our results overall point to the need to strengthen the governance model for both joint-stock and cooperative banks while supporting the view that a more ad hoc perspective of the best models and practices for each type of institutional setting would be recommended. Regarding the more specific discussion on the level of expertise and education that should be required to become a director of a bank board, our evidence points to a positive role of a low education level on risk-taking. We are not suggesting that less-educated boards are a desirable feature of banks' boards. In this respect, our evidence is able to highlight only that the weakness of the cooperative bank governance model remains an issue even in light of their stronger resilience during the crisis. The remainder of the paper is organized as follows. The next section specifies our testable hypotheses and discusses the related literature. Section III describes our empirical design

and related methodological issues, and Sections IV and V discuss our results and our robustness checks. The last section discusses policy implications and concludes the paper.

2. An overview of the Italian banking system

Italy is a bank-oriented system in which banks are the key providers of loans to non-financial companies and the main collector of household savings. On the one hand, credit provided by banks is almost of 166 percent of Italy's GDP, which is relatively higher compared to Germany (127 percent) and France (157 percent). On the other hand, Italian banks have deposits amounting to almost 69 percent of total liabilities, which is higher than the levels for French (54 percent) and German banks (62 percent). Overall, banks account for almost 85 percent of Italy's financial sector, and their total assets represent approximately 220 percent of Italian GDP.

In particular, the Italian banking system is composed of a few large banking groups that operate nationally and internationally and a large number of small banks that operate locally, mainly in the form of cooperative banks. Specifically, the Italian banking system consists of approximately 540 banks with approximately 27,400 branches distributed throughout the country (Bank of Italy, 2018). As a consequence, the Italian banking system is not very concentrated. Table 1 presents the number of banks and their branches, classified by bank institutional setting.

Insert Table 1 about here

In Italy, banks adopt two main institutional settings. On the one hand, joint-stock banks are established as joint-stock companies. They pursue the goal of maximizing shareholder value and can be listed on stock exchanges. Shareholders are the bank's owners and residual claimants. On the other hand, Italy has a large and well-developed system of cooperative banks (Becchetti, Garcia, & Trovato, 2011; Bofondi & Gobbi, 2006; Fiordelisi & Mare, 2013; Giagnocavo, Gerez, & Sforzi, 2012). In cooperative banks depositors, borrowers and owners usually overlap. Generally, cooperative banks can operate only in a limited area and prevailingly with their members. Thus, cooperatives satisfy the needs of their members, owners, customers and/or employees at the same time. From this perspective, profitability is not the main objective of such banks. The cooperative objective is less clearly defined, as the cooperative business model is motivated not by profit maximization but rather by a combination of economic and social goals.

Regarding owner rights, the cooperative model has vaguely defined ownership rights (Chaddad & Cook, 2004). Indeed, members retain one vote per capita, irrespective of the subscribed capital. New members are equivalent to existing members in terms of the votes they can express at the general annual meeting. There are limits regarding the amount of shares that owners may possess and the profit distribution: profits are set aside as a reserve. As a consequence, these limitations on ownership rights make it difficult to list a cooperative in a stock market (Hart and Moore, 1998). Finally, under a governance profile, it should be noted that cooperatives are generally self-administered such that cooperative members usually elect the board members from amongst the membership (Shaw, 2006).

The cooperative form is the most widespread legal status among Italian banks, and cooperative banks are particularly strong in localized areas. Almost 60 percent of Italian banks adopt the status of cooperative banks (including the Italian Banche di Credito Cooperativo – BCCs – and the Italian Banche Popolari Cooperative – BPs), and joint-stock banks constitute the remainder (Statistical Database of the Bank of Italy, 2018). Italian cooperative banks are similar in their objectives and main features to most cooperative banks in Europe, as they are also part of the European Association of Co-operative Banks.

In Italy, cooperative status is adopted by Italian BCCs (Art. 28 Legislative Decree no. 385/1993) and by Italian BPs. Even if BCCs and BPs are similar with regard to the voting rights of their members who are entitled to the "one person, one vote" principle, these banks actually differ in several respects (Jassaud, 2014). BCCs function in a well-defined geographical area and serve mainly their members, who typically must reside or permanently work in the area in which the bank operates. To found such banks, the law sets a minimum of 200 members (Art. 30 and 34 Legislative Decree no. 385/1993). The entry of new members is approved by the bank's board of directors (Article 30 Legislative Decree no. 385/1993), which may also refuse admission. Members cannot hold equity shares for amounts in excess of €50,000. According to the standard statute of cooperative banks approved by the Bank of Italy, cooperative members cannot transfer their shares to non-members without the approval of the board. Moreover, BCCs must retain almost 70 percent of their annual profit as a reserve. In addition, BCC directors are elected from among cooperative members. Unlike BCCs, BPs can operate with non-members and do not have geographical limitations. The net profits of BPs can be distributed to members except for a quota of at least 10 percent allocated to the legal reserve. Finally, unlike BCCs, the shares of BPs can be publicly traded. Although BPs are a hybrid of joint-stock banks and BCCs, they are closer to the former than to the latter in terms of operational characteristics. In fact, BPs are large banks

operating on a broad (national/international) scale that offer a wide range, even a sophisticated range, of financial services (Tarantola, 2009).

3. Related literature and hypotheses development

3.1 Risk propensity and bank institutional settings

The literature highlights that cooperative banks have, on average, less incentive to take on more risk than joint-stock banks. Hansmann (2000) emphasizes that during the US savings and loan crisis, investor-owned banks took on more speculative investment than mutual savings and loan associations. Based on a sample of 16,577 banks from 29 OECD countries over the 1994-2004 period, Hesse & Čihák (2007) find that cooperative banks are more stable, given that they have, on average, a higher Z-index and lower profit volatility than commercial banks. Studies of a number of EU countries reveal the same results. García-Marco & Robles-Fernández (2008) analyze a sample of Spanish banks over the 1993-2000 period and find that cooperative banks take on less risk than commercial banks. Beck, Hesse, Kick, & von Westernhagen (2009) show that cooperative and savings banks in Germany are more stable than private banks. Finally, Köhler (2015) analyzes the impact of business models on bank stability in 15 EU countries between 2002 and 2011 and finds that savings and cooperative banks are more stable than investment banks, which typically take the form of joint-stock companies. These findings are consistent with the pivotal role of cooperative banks, which is to provide loans to its members, such that profit maximization objectives are tempered by the broader goal of maximizing the general interests of their members and the community over the long run (Fonteyne, 2007). Furthermore, the characteristics of cooperative ownership structure and the superior abilities of cooperative banks in handling customers' information could contribute to explaining these findings (Borgen, 2004; Chaddad & Cook, 2004; Hart & Moore, 1998, Fiordelisi & Mare, 2013; Groeneveld & de Vries, 2009; Hesse & Čihák, 2007).

While these theoretical arguments attempt to explain the negative relation between a cooperative institutional setting and risk-taking behavior, no studies empirically investigate the potential drivers of this relationship. Moreover, the role of the board of directors is completely neglected. However, the board of directors is the body that makes decisions concerning business opportunities, approves bank strategies and, therefore, determines how much risk the bank can take. Therefore, we analyze the risk propensity of cooperative and joint-stock banks by focusing on the underlying mechanisms at the board level. Empirical studies have widely analyzed the impact of board structure (in terms of size, gender composition, etc.), directors' independence and compensation packages on firm/bank outcomes, but less attention has been paid to board education and turnover. However, corporate governance standards stress the importance of hiring directors with strong knowledge and the competences necessary to grasp the complexity of banking business and, thus, the associated risks. Scholars highlight that more (and better) educated directors are expected to deal better (at lower cost) with these complexities and risks and thus to make better decisions (Harris & Raviv, 2008). While education and financial expertise are not enough to ensure that the board effectively assesses risk-taking, it is an important pre-requisite (Mehran et al., 2012). Moreover, while governance standards highlight the risks associated with low board turnover because it implies a higher likelihood of entrenchment problems and thus lowers directors' ability to monitor managers (Boubakri, Dionne, & Triki, 2008), board turnover is also considered beneficial for organizations in responding to and managing environmental threats and uncertainty (Jiang & Peng, 2011; Young, Buchholtz, & Ahlstrom, 2003). Based on this literature, our conceptual model proposes that board education and turnover are explanatory factors of the relationship between institutional setting and bank risk-taking (Figure 1). The extent to which the bank institutional setting affects bank risk-taking and whether this relationship is explained by board education and turnover constitute our empirical question.

Insert Figure 1 about here

3.2 Board education, turnover and cooperative bank risk-taking

In the agency perspective, the board of directors has a key role in monitoring managers to prevent them from pursuing their own interests over those of the owners (Fama & Jensen, 1983). In the banking sector, the role of the board is even more critical than it is in other industries. The banking business is complex and therefore nontransparent to a wide audience of stakeholders (shareholders, creditors, debtors, regulators, etc.). Thus, boards of directors have a key role in bank governance because they not only monitor management but also provide guidance and advice to managers (de Andres & Vallelado, 2008; Grove, Patelli, Victoravich, & Xu, 2011).

Given the predictions of agency theory and the characteristics of the cooperative model, we argue that the legal status of a cooperative could impact board characteristics in terms of education and turnover.

Cooperatives are characterized by weak ownership rights that increase free-riding problems in monitoring activities (Borgen, 2004; Hart & Moore, 1998; Vitaliano, 1983). Furthermore, cooperative objectives are opaque and less clearly defined because of the ambiguous role of cooperative owners, who are simultaneously customers (depositors and/or borrowers) and employees. In this situation, the board cannot effectively perform its tasks (monitoring, advice, strategic, etc.) because of a lack of clear performance measures. As a result, the literature suggests that the board tends to operate in ways that reflect individual board members' professional or personal competencies despite cooperative members' preferences (Miller, 2002). Therefore, board members' competencies are crucial to effectively manage cooperatives.

Regarding the competence levels of cooperative board members, the literature highlights that in cooperative organizations, the idea of non-professional boards is central, and therefore, anyone can be elected as a board member. The institutional setting of cooperatives is widely influenced by a democratic perspective (Cornforth & Edwards, 1999; Cornforth, 2004; Hung, 1998). The key ideas of the democratic perspective include open elections with a "one person, one vote" mechanism; representatives for different constituencies or interests; accountability to the electorate; and self-administration, as cooperative members typically elect the board of directors from among their membership (Davis, 2001; Shaw, 2006). Therefore, from a democratic perspective, the board has the task of representing the interests of the organization's members regardless of the board members' competence level.

Consequently, expertise may be desirable but not essential, as it is in corporations. Therefore, clear gaps may remain in the collective skills and experience required for an effective board. In sum, while stewardship theory suggests that board members should be selected for their professional expertise and skills, the democratic perspective (and, to some extent, stakeholder theory) highlights that board members are lay representatives and that they serve the stakeholders they represent. As a consequence, compared to the directors of corporations, cooperative directors do not always have high educational qualifications or professional experience in the field (Allemand, Brullebaut, & Raimbault, 2013; Cornforth, 2004; Hardesty, 2005; Keeling, 2004; Servin, Lensink, & van den Berg, 2012; Shaw, 2006; Vitaliano, 1983). Cooperative members are usually ordinary citizens, professionals, craftsmen, traders, farmers or retirees. Analyzing a sample of Italian cooperative banks, Schwizer & Stefanelli (2011) show that, on average, 46% of the directors are entrepreneurs, farmers and artisans, 23% are professionals (accountants, lawyers, etc.), 17% are retirees and 15% represent other categories (civil servants, doctors and unemployed). Furthermore, 18% of the directors have only a graduation certificate from middle school, 52% have a high school diploma, and only 30% have a university degree. In their survey, Alexopoulos, Catturani, & Goglio (2013) obtain similar results.

Given these theoretical and empirical arguments, cooperative banks will have a low level of board education compared to joint-stock banks.

However, scholars recognize that educational background is a demographic characteristic of top management that affects managerial behavior and firm performance (Hambrick & Mason, 1984). Educational degrees are considered proxies for knowledge base or intelligence, and it is expected that managers with higher educational degrees should be better equipped to process complex information, respond to change and innovate. In particular, Bantel & Jackson (1989) analyze the relationship between top management characteristics and innovation in banking and find that top managers' education is positively related to a greater propensity to engage in innovative projects. Other studies show that well-educated top management is associated with a higher probability of changes in firm strategy, such as in the direction of a more internationally diversified portfolio (Herrmann & Datta, 2005; Wiersema & Bantel, 1992). Finally, scholars suggest that high educational levels lead to more open-mindedness, a higher likelihood of undertaking change, innovation and a greater ability to process information (Hambrick & Mason, 1984; Wincent, Anokhin, & Örtqvist, 2010). With regard to the relationship between education and risk-taking, the empirical literature has found conflicting evidence (Berger et al., 2014) but is in favor of the notion that higher education is positively associated to more aggressive strategic choices and, thus, with risk-taking propensities because education breeds overconfidence and greater tolerance to risk (Beber & Fabbri, 2012; Bertrand & Schoar, 2003; Camerer & Lovallo, 1999; Frank & Goyal, 2007). Moreover, low education leads to a focus on traditional business, which is better known. Among others, Bertrand & Schoar (2003) show that firms whose managers have an MBA appear to follow more aggressive strategies and run more-leveraged companies.

Therefore, we argue that board education functions as a mediating variable that transmits the effect of a cooperative institutional setting to bank risk-taking. Our idea suggests that the lower level of director education in cooperative banks can contribute to explaining their lower risk-taking despite cooperative members' risk preference. Our hypothesis is thus as follows:

Hp 1: *Board education mediates the relationship between bank institutional setting and bank risk. In particular, cooperative status leads to low levels of director education, which in turn leads to low levels of bank risk.*

In agency theory, the turnover of board members or top managers is a key mechanism that exerts pressure on these actors to act in the interests of shareholders. In fact, shareholders can threaten dismissal if board members and/or top management do not act in their interests (Hermalin & Weisbach, 2003; Kaplan, 1994). From the resource dependence perspective, while excessive turnover could be detrimental because it will reduce the presence of firm-specific knowledge on the board (Forbes & Milliken, 2008), it is recognized that a moderate level of board turnover may be beneficial for the organization. A stream of research has shown that the board of directors is a particular change mechanism by which firms can respond to and manage environmental threats and uncertainties (Harrison, Torres, & Kukalis, 1988; Krivogorsky & Eichenseher, 2005; Mizruchi & Stearns, 1988). Through directors' selection and turnover, the views and interests of important internal and external stakeholders are reflected in board composition and can promote strategic and organizational change in order to challenge and better respond to changes in the environment. Therefore, board turnover can be beneficial for a well-functioning board to incorporate new ideas into strategic decisions and ensure that the board composition is in line with the environment and needs of the firm (Jiang & Peng, 2011; Young et al., 2003).

However, the replacement mechanism in cooperative banks is not as effective as it is in joint-stock banks for a number of reasons: i) because of their dispersed ownership and the one vote per capita principle, individual members have less interest in and less incentive to spend resources to monitor and control directors, preferring to free-ride instead; ii) because shareholders are both members and customers at the same time, they may be more interested in obtaining loans on good terms than in controlling directors; and iii) because cooperative banks' shares are not listed and because they typically face low levels of competition in the local area in which they operate, they are less likely to face scrutiny by sophisticated shareholders (Cook and Iliopoulos, 1999; Hart & Moore, 1998). Thus, cooperative directors are subject to lower external controls.

Consequently, the literature suggests that board members in cooperative banks can become a 'self-perpetuating autocracy' (Nicols, 1967) – particularly when compared to joint-stock banks – and that cooperatives have less board turnover (Battistin, Graziano, & Parigi, 2012; Stefancic, 2014). This finding implies that cooperative directors might remain in their posts for long periods, even when they are ineffective, as they are insulated and protected from many internal and external pressures (Spear, 2004). Given these theoretical explanations, we expect that the cooperative model has lower director turnover. In this situation, board members will become powerful and entrenched so that they can exploit cooperative resources to pursue their own advantage, including protecting their position. On the other hand, they are incentivized to prefer a "quiet life" and to avoid organizational change or innovative and risky projects that may affect their current positions and future benefits (Bertrand & Mullainathan, 2003). These incentives are even stronger when directors are also investors in (customers of) the bank (Konishi & Yasuda, 2004).

Therefore, we test the hypothesis that director turnover mediates the relationship between the bank institutional setting and bank risk-taking. Our hypothesis is formulated as follows:

Hp 2: *Board turnover mediates the relationship between bank institutional setting and bank risk. In particular, cooperative status leads to low board turnover, which, in turn leads to low bank risk.*

4. Research design: sample, variable and estimation framework

4.1 Sample and data collection

Our hypotheses were tested on the population of Italian banks over the 2011-2017 period. We retrieved the population of banks operating in Italy from the statistical information system of the Bank of Italy. In particular, we focus on joint-stock and cooperative banks (Italian BCCs). We excluded branches of foreign banks. Data collection was performed from different databases. We used the statistical information system database of the Bank of Italy to collect demographic information (bank name, location, age, etc.) for the sampled banks and information about banks that acquired other banks during the period. As for information on bank board characteristics, we hand-collected these data from bank websites, governance reports and financial statements. We further checked this information with reference to Associazione Bancaria Italiana (ABI) Yearbooks. The ABI Yearbook is published annually and reports information on the governing bodies (size, gender, etc.) of each Italian bank. Finally, we collected bank balance sheet data from the Bankscope database.

Overall, we identified 766 banks that operated in the 2011-2017 period. Banks that began their business after 2011 and banks that closed down before 2017 were included in this group. We kept only those banks with information available for at least two consecutive years (Pathan, 2009). We excluded 89 banks due to missing information. Moreover, we excluded all annual observations related to banks that were affected by special

measures taken by the supervisory authority (special administration, interim management, etc.) because of non-comparability issues in financial data and in board composition[1]. We initially excluded BPs from the analysis because of their hybrid institutional setting. Moreover, there are only 39 BPs (i.e., 5 percent of our sample), with 241 year observations. In the section on robustness checks, we report estimates including BPs.
The final sample comprises 638 banks, consisting of 198 joint-stock banks and 440 cooperative banks. Our data gathering resulted in an unbalanced panel of 4,176 observations.

4.2 The dependent variable – bank risk

We proxy bank risk using a number of measures that are used extensively in the banking literature. First, we use the Z-index (De Nicoló, Jalal, & Boyd, 2006; Laeven & Levine, 2009; Pathan, 2009), which is calculated as the sum of the equity-asset ratio (or capital-asset ratio; CAR) and return on assets (ROA) divided by an estimation of the ROA's standard deviation. A higher Z-index indicates that a bank is less risky and thus more solvent. This measure provides the number of standard deviations that the ROA must decrease before equity capital is depleted and the bank is consequently insolvent. We calculate the Z-index as follows:

$$Z_{i,t} = \frac{ROA_{i,t} + CAR_{i,t}}{\sigma(ROA)_{i,t}}$$

where $ROA_{i,t}$ and $CAR_{i,t}$ are the return on assets and the equity-asset ratio, respectively, of bank i during the period t, calculated at the end of the fiscal year. ROA is calculated as the ratio of pre-tax profit to total assets. To compute the $\sigma(ROA)_{i,t}$ of bank i in period t, we used data from two periods (t, $t-1$) to capture the short-term fluctuations of bank risk (Delis, Hasan, & Tsionas, 2014; Delis & Staikouras, 2011). Using data from three periods (t, $t-1$ and $t-2$), the results remain unchanged. Finally, to address the skewness of the Z-index, we take its natural logarithm.
Next to this ratio, we use a proxy for banks' ex post credit risk-taking – the non-performing loan (NPL) score – which is defined as the ratio between non-performing loans and gross loans measured at the end of the fiscal year. This score provides information on the quality of a bank's loan portfolio. This score is not fully comparable with the Z-index, as it focuses only on lending banks' traditional core activity. Lending remains the predominant activity in smaller and more traditional banks (such as cooperative banks) but is less fundamental in well-diversified banks, such as joint-stock banks. As expected, the Z-index and NPL score are negatively correlated: higher credit risk increases ROA volatility, which in turn leads to a low level of bank solvency. Finally, in line with the recent literature, we also test our hypotheses using the standard deviation of profit, i.e., $\sigma(ROA)_{i,t}$, as the dependent variable (Delis & Staikouras, 2009; Schaeck & Cihák, 2014).

4.3 Key independent and control variables

To test our hypotheses related to the relationship between bank risk-taking and bank institutional setting, the independent variable is a dummy variable equal to 1 for cooperative banks and 0 otherwise. Joint-stock banks are the baseline category. To avoid spurious relations between the dependent and independent variables, we control for bank and board characteristics that may affect bank risk-taking. Regarding bank-level variables, it is generally acknowledged that bank risk is influenced by firm characteristics. Therefore, we control for bank size, bank age, the ratio of loans to total assets as a proxy for the bank business model (Andres & Vallelado, 2008) and bank growth, measured as the growth rate of bank assets. We measure bank size as the natural log of banks' total assets at the end of the fiscal year. Bank age is the natural log of a bank's age. The asset growth rate is the year-on-year percentage change in banks' total assets.
Furthermore, we consider a dummy variable for listed banks that equals 1 if bank i is listed on a stock market during period t and 0 otherwise. Listed companies are subject to greater scrutiny from stock markets and regulatory authorities (Dyck, Morse, & Zingales, 2010) and are thus expected to manage their risk more closely. Moreover, we include the following control variables in the model with the Z-index and $\sigma(ROA)$ as the dependent variables: i) a variable to control for an abnormal level of NPL, measured as a dummy variable equal to 1 if the NPL score of bank i in year t is higher than the 90th percentile, and 0 otherwise; ii) a dummy variable equal to 1 if bank i completed an acquisition in time t, and 0 otherwise.
On the board level, we consider the following control variables that might affect bank risk-taking.

Board size. This variable is expressed as its natural log. The literature highlights the relationship between board size and firm risk-taking. In particular, scholars suggest that small board size is positively related to firm risk-taking, as a smaller board leads to a closer alignment with shareholder interests, which in turn increases company risk-taking (Chaganti, Mahajan, & Sharma, 1985; Minton et al., 2014; Nakano & Nguyen, 2012; Pathan, 2009).

Gender diversity. This variable is expressed as the proportion of female directors on the board. Gender diversity is a demographic characteristic that influences risk-taking. In the banking literature, scholars highlight that women are more risk averse than their male counterparts (Beck, Behr, & Guettler, 2013; Bellucci, Borisov, & Zazzaro, 2010; Berger et al., 2014; Palvia, Vähämaa, & Vähämaa, 2014).

Board turnover. Following Eldenburg, Hermalin, Weisbach, & Wosinska (2004), board turnover is calculated as

$$\frac{(\text{N.of new directors at } t) + (\text{N. of directors that left the board between } t \text{ and } t\text{-1})}{2 \times (\text{Board size at } t-1)}$$

Scholars note that replacing directors is a means of persuading them to do their job better (Franks, Mayer, & Renneboog, 2001; Kang & Shivdasani, 1995; Kaplan, 1994). In addition, board turnover is a proxy for entrenchment risk (Schulze, Lubatkin, Dino, & Buchholtz, 2001).

Board education. Ideally, the proxy for board education would include detailed information about the level of education (undergraduate degree, MBA, Ph.D., etc.), the main subject studied (expertise) and the academic institutions that awarded the degree for each director (King, Srivastav, & Williams, 2016; Lester, Certo, Dalton, Dalton, & Cannella, 2006). Unfortunately, this information is not always available, particularly for cooperative banks, as cooperative banks are smaller and much more opaque (San-Jose, Retolaza, & Gutierrez-Goiria, 2011). Following Audretsch & Lehmann (2005), Colombelli (2015) and Wincent, Anokhin, & Örtqvist (2010), we proxy for the education of bank *i*'s board in period *t* by calculating the proportion of directors with at least a university degree. We have little or no information on post-graduate education (e.g., PhD, MBA or equivalent degrees). However, our proxy should be able to capture the biggest differences in the board's education level between the two types of banks, given the substantially weaker mechanism of director selection adopted in cooperative banks (Alexopoulos et al., 2013; Schwizer & Stefanelli, 2011; Shaw, 2006).

Executive committee. Board effectiveness is a function not only of its composition (gender diversity, outside/inside directors, etc.) but also of its structure, e.g., the presence of board committees (Biao, N. Davidson, & J. DaDalt, 2003; Kesner, 1988; Klein, 1998). Therefore, we control for the presence of board committees. However, information on board committees for our sample is limited. We found information only on the existence of an executive committee. Therefore, we add a dummy variable equal to 1 if bank *i* in period *t* established an executive committee and 0 otherwise.

Independent directors. The literature suggests the beneficial effect of independent directors on effective corporate governance, but the findings in this instance are not conclusive (Andres & Vallelado, 2008; Bhagat & Black, 2002; B. K. Boyd, 1994; Fama, 1980). However, in our estimations, we omit this variable because it is not clearly identifiable in cooperative banks as board members are elected among the owners, who are also customers (depositors or debtors) of the bank. Consequently, it is questionable whether these directors are ever independent (Basel Committee on Banking Supervision, 2015; European Association of Co-operative Banks, 2015).

Regional GDP growth. To account for varying economic conditions over time, we include the GDP growth rate calculated for each of the 20 Italian regions as an indicator of local economic conditions.

Year and regional fixed effects. We control for Italian macro-regions to limit spurious effects related to different contextual conditions (economic, social and institutional differences, among regions, etc.) that might affect bank governance variables (Beck, De Jonghe, & Schepens, 2013; Boytsun, Deloof, & Matthyssens, 2011; Guiso, Sapienza, & Zingales, 2009) as well as bank activity. To control for regional fixed effects, we create four dummy variables for Northeast Italy, Northwest Italy, Central Italy, and South Italy and the Islands. Northeast Italy is used as the baseline. Moreover, all models are estimated with year fixed effects to control for changes in macroeconomic conditions.

We highlight that based on the information collected from the annual yearbooks of the Italian Banking Association, the CEO is absent from cooperative banks and from the large majority of joint-stock banks in our sample (only 4 percent are listed). Therefore, we do not control for CEO characteristics (e.g., pay, tenure, age, gender, duality, etc.).

4.4 Methodology

To test whether board turnover and board education serve as significant channels through which bank institutional setting affects bank risk (the dependent variable) (hypotheses 1 and 2), we perform a mediation analysis (Baron & Kenny, 1986) (Tab. 4). In general terms, a mediation model aims to explore the mechanism underlying an observed relationship between an independent variable and a dependent variable via the inclusion of a third explanatory variable, the mediator variable (Baran & Forst, 2015; Lang, Lins, & Maffett, 2012; Lins, Volpin, & Wagner, 2013). This approach is performed in four steps. In the first step, we estimate the relationship between the independent variable (cooperative dummy) and bank risk. To test this relation, we estimate the following panel model:

$$Bank\ \text{risk}_{i,t} = a_j + \lambda_t + \beta\ Cooperative_i + \gamma\ X_{i,t} + \delta\ Y_{k,t} + \varepsilon_{i,t} \qquad [1]$$

Bank risk is measured as the NPL ratio, the Z-index and the standard deviation of ROA, alternatively. On the right-hand side, a_j and λ_t are the macro-region and year fixed effects, respectively; $X_{i,t}$ is a set of time-varying bank-specific control variables; and $Y_{k,t}$ is a set of time-varying regional control variables (GDP growth rate). The dummy *Cooperative* is our variable of interest. We use a dynamic panel approach to estimate the model [1], including one lag of the dependent variable as a regressor to account for the dynamic nature of risk (Delis & Kouretas, 2011; Köhler, 2014). The GDP growth rate, year and regional fixed effects are also included.

Model [1] is estimated through a GMM estimator approach because of endogeneity issues in our model (Blundell & Bond, 1998). While our key independent variable – a proxy for the institutional setting – is treated as exogenous (Gorton & Schmid, 1999), we add the following endogenous control variables: i) the lagged dependent variable and ii) corporate governance variables at the board level. Given that our independent variable is time-invariant, we use the system GMM estimator, which allows us to use time-invariant variables as regressors. Specifically, we use the two-step system GMM because it provides efficient estimators (Bond, Hoeffler, & Temple, 2001). Moreover, the two-step GMM results in a robust Hansen *J*-test for over-identification. We also use robust standard errors that lead to consistent results in the presence of heteroskedasticity and autocorrelation problems. To test the validity of our approach, we use the Hansen *J*-statistic of over-identifying restrictions to test the instruments' validity, namely, the lack of correlation between the instrumental variables and the error term. In addition, we test the presence of first- and second-order serial correlation. The absence of second-order serial correlation indicates that the model is correctly specified and therefore that the estimates are not inconsistent.

In the second step, we determine whether the independent variable (cooperative dummy) significantly affects the mediators (board turnover and education) by estimating the following panel models:

$$Board\ turnover_{i,t} = a_j + \lambda_t + \beta\ Cooperative_i + \gamma\ X_{i,t} + \varepsilon_{i,t} \qquad [2]$$

$$Board\ education_{i,t} = a_j + \lambda_t + \beta\ Cooperative_i + \gamma\ X_{i,t} + \varepsilon_{i,t} \qquad [3]$$

In equation [2], we control for bank size, bank age, business model and bank performance (measured as ROE). Moreover, we include a dummy variable for listed banks (Liu, Wang, Zhao, & Ahlstrom, 2013), and we account for year and regional fixed effects. In equation [3], we use the previous control variables, and we add board size. We estimate models [2] and [3] using an instrumental variable (IV) approach to control for simultaneity bias between the dependent variable and bank performance. We instrument bank performance with its own first and second lags.

In the third step, we test the relationship between the mediators (board turnover and board education) and bank risk by estimating the following model:

$$Bank\ risk_{i,t} = a_j + \lambda_t + \beta_1 Board\ education_{i,t} + \beta_2 Board\ turnover_{i,t} + \gamma\ X_{i,t} + \delta\ Y_{k,t} + \varepsilon_{i,t} \qquad [4]$$

Finally, we combine the first and the third steps and test whether the dummy for cooperative banks affects the dependent variable through board turnover and board education. Specifically, we estimate model [1] by adding board turnover and education as control variables. The existence of a mediation effect cannot be rejected if the mediators reduce the magnitude of the coefficient of our variable of interest, *Cooperative dummy*, and the mediators (board turnover and education) should be significant. We use Sobel's test to assess the significance of the reduction or mediation effect (Sobel, 1982). This approach tests whether the indirect effect of the independent variable (cooperative dummy) on the dependent variable (bank risk) via the mediators (board turnover and education) is significantly different from zero.

Finally, we highlight that to mitigate the impact of outliers, all variables with extreme values are winsorized at the 1% and 99% levels.

4.5 Summary statistics

Table 2 presents descriptive statistics for our main variables. Table 3 shows the mean comparison between joint-stock and cooperative banks. Finally, Table 4 presents the correlation matrix.

Insert Table 2 about here

As shown in Table 2, most Italian banks have a strong focus on traditional and core activities, as 66% of their assets consist of customer loans, and their asset growth is approximately 9%, with an average profitability of 4.8%. Bank boards typically consist of 10 members, of which only 4.7% are female directors. As for our key variables at the banking system level, board turnover is 12.5% and 39.4% directors have a university degree or higher. Table 3 indicates that low board education in the Italian banking industry derives from cooperative banks, in which approximately 23% directors have a university degree or higher, in contrast to 77% for joint-stock banks.

Insert Table 3 about here

Table 3 shows that there are significant differences between joint-stock and cooperative banks with regard to bank structure and board characteristics. Compared to joint-stock banks, cooperative banks are smaller ($t = 40.396$, $p < 0.1\%$) and older ($t = -26.255$, $p < 0.1\%$), and their business models are based primarily on loan activities ($t = -3.593$, $p < 0.1\%$). Compared to the boards of joint-stock banks, the boards of directors of cooperative banks are smaller ($t = 13.811$, $p < 0.1\%$) and have more women ($t = -7.642$, $p < 0.1\%$). In addition, in cooperative banks, both board turnover ($t = 11.78$, $p < 0.1\%$) and board education ($t = 77.251$, $p < 0.1\%$) are significantly lower than in joint-stock banks.

Finally, joint-stock and cooperative banks differ significantly in terms of their risk levels. We highlight that while cooperative banks have a higher Z-index ($t = -9.769$, $p < 0.1\%$) and a lower standard deviation of ROA ($t = 4.754$, $p < 0.1\%$) than joint-stock banks, they take higher credit risk ($t = -13.884$, $p < 0.1\%$).

Table 4 shows that the correlation coefficients between our main variables are quite low, and we can thus assume that the multicollinearity problems in our models are modest. In particular, we note that both board turnover and board education are significantly associated with bank risk level. Board turnover is negatively associated with bank risk, and hence an increase in director turnover leads to low bank stability as measured by the Z-index ($\rho = -0.12$, $p < 0.1\%$), high profit volatility as measured by σ(ROA) ($\rho = 0.091$, $p < 0.1\%$), and high credit risk as measured by NPL/Gross Loans ($\rho = 0.04$, $p < 5\%$). Meanwhile, board education is negatively associated with bank risk as measured by the Z-index ($\rho = -0.222$, $p < 0.1\%$) and positively associated with profit volatility ($\rho = 0.146$, $p < 0.1\%$). Therefore, an increase in directors' education leads to low bank solidity and high profit volatility. However, board education is negatively associated with credit risk. Thus, an increase in board education leads to low credit risk ($\rho = -0.167$, $p < 0.1\%$).

Insert Table 4 about here

5. Results

In Table 5, we present the results of our mediation analyses. We measure bank risk with the Z-index, σ(ROA) and the NPL/Gross Loans ratio.

All models are significant, and the Hansen's *J* test statistic of over-identifying restrictions and the serial-correlation tests do not reject the null hypothesis of correct specification. Therefore, the models are well-fitted and do not suffer from serial correlation problems and the instruments are exogenous. Although the models indicate the presence of first-order autocorrelation ($\Pi 1$), since $\Pi 1$ is statistically significant, our results are not inconsistent because this issue arises if a significant second order autocorrelation ($\Pi 2$) emerges (Blundell & Bond, 1998). Moreover, as suggested by Roodman (2009), we report the number of instruments used in the estimation, which is lower than the number of the panel group (610). Therefore, the Hansen *J*-statistic is more reliable. Finally, we note that in all the estimated models, the control variables have the expected signs and the

lagged dependent variables are also significant, indicating that bank risk is persistent. In particular, when the lagged dependent coefficient is significant and between 0 and 1, it suggests that risk persists but will eventually return to its average level.

To test the mediating effects of board education and turnover (hypotheses 1 and 2) on the relationship between cooperative status and bank risk, we follow the approach developed by Baron and Kenny (1986). Accordingly, Table 5 presents i) in column (1) the results of model [2] (using clustered robust standard errors) testing the relationship between our main independent variable (cooperative dummy) and board turnover and ii) in column (2) the results of model [3] (using clustered robust standard errors) that test the relationship between cooperative dummy and board education. Results indicate that the dummy for cooperative bank status has a highly significant and negative effect on board turnover ($\beta = -0.052$, $p < 0.1\%$) and on board education ($\beta = -0.447$, $p < 0.1\%$). Thus, there is significant evidence that board turnover and education are significantly lower in cooperative banks than in joint-stock banks. Moreover, we find a significant association between the independent variable and bank risk (model [1]). In column (3), we note a positive association between the cooperative dummy and the Z-index ($\beta = 1.46$, $p < 1\%$). In column (7), we note a negative association between the cooperative dummy and profit volatility, σ(ROA) ($\beta = -1.39$, $p < 1\%$). Therefore, coherently with extant literature we conclude that cooperative banks are more stable and have less volatile profitability than joint-stock banks. Surprisingly, column (11) reports no association between the cooperative dummy and the NPL/Gross Loans ratio, our proxy for credit risk-taking (see later in section 4.1 for further investigation).

Insert Table 5 about here

We also estimate the relationship between the mediators and the dependent variable (model [4]). When bank risk is measured as Z-index, in column (4), we note that the first mediator variable (board turnover) does not affect bank risk ($\beta = 1.00$, $p > 10\%$), while the second mediator, board education, has a highly significant and negative effect on bank risk ($\beta = -1.77$, $p < 5\%$). Moreover, we perform the last step of the mediation analysis, thus we add one at time board turnover and board education to model [1]. When board turnover is added to the model (column 5), the latter remains insignificant ($\beta = 1.52$, $p > 10\%$) and the coefficient of the cooperative dummy remain significant but it decreases its effect from 1.46 (in column 3) to 1.08 (column 5). Overall, we thus find that board turnover does not mediate the relationship between the institutional setting of a bank and bank risk. Finally, in column (6), we show that the coefficient of the cooperative dummy variable is reduced in its effect and significance ($\beta = 0.0826$, $p > 10\%$) when board education is added to the model, while board education remains significant ($\beta = -1.95$, $p < 1\%$). Thus, our evidence confirms that board education mediates the relationship between the cooperative status of a bank and bank risk, as measured by the Z-index. The Sobel's test is statistically significant suggesting that board education indeed serves as a channel through which bank institutional setting affects bank risk ($t = 3.36$, $p < 0.1\%$).

We obtain similar results when bank risk is measured as profit volatility, i.e., σ(ROA). In column (7), we show that our independent variable has a highly significant and negative impact on bank risk, suggesting that cooperative banks are significantly less risky than joint-stock banks. In column (8), we show that although board turnover does not affect the σ(ROA) ($\beta = -0.30$, $p > 10\%$), board education has a highly significant and positive effect on bank risk ($\beta = 1.93$, $p < 5\%$). Therefore, we can conclude that board turnover does not mediate the relationship between cooperative status and bank risk-taking. In fact, in column (9) we observe that when board turnover is added to the model with the independent variable (cooperative dummy), it remains insignificant ($\beta = -0.63$, $p > 10\%$) and the coefficient of the cooperative dummy increases from – 1.39 (in column 7) to – 1.066 (column 9). Again, we conclude that board turnover does not mediate the relationship between the cooperative status of a bank and bank risk. Finally, in column (10), we show that when board education is added to the full model, the coefficient of the cooperative-status dummy variable is insignificant ($\beta = -0.22$, $p > 10\%$), and the mediator variable is positive and significant ($\beta = 1.85$, $p < 5\%$). However, the coefficient of the cooperative-status dummy variable is reduced from – 1.06 (in column 9) to – 0.22 (column 10), and the significance level of the coefficient is also reduced. Thus, we can conclude that board education partially mediates the relationship between bank cooperative status and bank risk, as measured by profit volatility. Also in this case the Sobel's test is significant ($t = -3.35$, $p < 0.1\%$)

Surprisingly, when credit risk is used as the dependent variable, the results do not support any mediation effect of board turnover and board education on the relationship between cooperative bank status and bank risk-taking. We note in columns 11 to 14 that the coefficients of our independent variable (Cooperative) and of the two mediators are all not significant, which suggests that the cooperative status of a bank has no impact on credit risk-taking, which is also the case when we consider the mediating role of board characteristics in terms of turnover and education. Overall, we conclude that our argument is partially supported by empirical evidence. In other words, we reject hypothesis 2 on the mediating effects of board turnover. By contrast, we do not reject

hypothesis 1 on the mediating effects of board education only when bank risk is measured as Z-index and σ(ROA).

5.1 Further investigation of credit risk

Given the inconclusive results on credit risk, we further extend our investigation in two directions. First, we try a different model specification by testing a moderating rather than a mediating hypothesis regarding board education and turnover on the relationship between bank institutional setting and credit risk. This test was not supported (not tabulated). Second, we exploit bank characteristics that play a key role in explaining credit risk. We focus on bank size as a proxy for relationship-oriented banking activity and on bank age as a proxy for bank experience in credit management (Berger, Miller, Petersen, Rajan, & Stein, 2005; Cole, Goldberg, & White, 2004; Wheelock & Wilson, 2000). We expect that small cooperative banks operating in localized areas have a closer relationship with their customers, such that the peer monitoring mechanisms are more effective and they therefore more heavily base their decisions on soft information. In contrast, larger cooperatives operating in larger areas will have more distant relationships with customers and are relatively more transaction-oriented, such that they resemble joint-stock banks. In addition, in larger geographical areas, peer monitoring mechanisms are less effective because the relationships between the bank and its customers and among customers are less stable. As a result, it can be assumed that small cooperative banks may have lower credit risk than larger cooperatives. With reference to bank age, we suggest that older banks have a greater opportunity to build their experience in credit management than younger banks, which should lead these older banks to have a better understanding of credit management policies at different levels of the credit process (from loan officers to CFOs and across credit cycles). Therefore, it can be expected that older cooperatives will have lower credit risk than younger cooperatives because they can better leverage their experience and their internal well of established procedures to conduct better evaluations of borrowers. Based on these considerations, we explore whether there is a moderating effect of bank size and age on the relationship between the cooperative status of a bank and credit risk. Specifically, we test both the two-way and the three-way interactions. In the first case, we added the interaction terms between the cooperative dummy variable and bank size and age (Cooperative × Bank size and Cooperative × Bank age) to the model in column 14 of Table 5. Subsequently, to test whether there is a three-way interaction, we include the last lower order term, i.e., the interaction between bank size and age and the three-way term, i.e., the interaction between *Cooperative dummy*, bank size and bank age. The results of these estimations support the existence of neither a three-way interaction between *Cooperative dummy*, bank age and bank size nor a two-way interaction between cooperative dummy and bank age (not tabulated), but they do point to the existence of a significant interaction between cooperative status and bank size. In Table 5, column (15), we tabulate only this last result. We find that *Cooperative dummy* (β = -0.66, p < 5%) is negatively associated with bank risk and that the interaction term (Cooperative × Bank size) is positively associated with bank risk (β = 0.03, p < 5%). In Figure 2, for small and large bank sizes, we plot the bank risk for joint-stock banks and for cooperative banks. Small size and large size are calculated as average bank size minus/plus a standard deviation, respectively.

Insert Figure 2 about here

We highlight that the difference in the simple slope for small banks and large banks is significantly different from zero (β = -0.1004, p < 5%; β = 0.0712, p < 5%, respectively). Consequently, credit risk is significantly moderated by bank size. While small cooperative banks take less risk than their joint-stock bank counterparts, large cooperatives take more risk than large joint-stock banks. Moreover, we note that the difference in credit risk between cooperative and joint-stock banks is much higher for small banks than for large banks. Finally, we note that small cooperative banks have lower credit risk than large ones (β = -0.029, p < 0.1%). On the contrary, small joint-stock banks have higher credit risk than large ones (β = 0.022, p < 5%) but with a lower level of significance compared to cooperatives. This finding seems consistent with the view that small cooperative banks operating in localized areas have a closer relationship with their customers such that soft information about the borrowers and the peer monitoring mechanisms are more effective in guiding risk-taking decisions than the directors' education level.

5.2 Robustness checks

We re-estimate models presented in Table 5 using a simple pooled OLS model replacing the contemporaneous board variables with their lag values. The interpretation of the results remains the same as that reported in Table

5 and hence is unreported. Additionally, Sobel's test calculated on these new estimates leads to the same conclusions as found previously.

Given the cooperative bank characteristics, a further robustness test is necessary to control for the possibility that the bank risk-taking we analyze is not directly related to board education but to the cooperative model itself. In other words, we must control for the possibility that cooperatives simply take less risk structurally than joint-stock banks because of their inherent business characteristics, despite their board members' education. To control for this possibility, we estimate our models only for the cooperative sub-sample. We should expect that board education is not significant if cooperative banks' risk-taking is driven mainly by their intrinsic characteristics. Table 6 shows the results of this analysis. The models in Table 6 are significant and correctly specified.

Insert Table 6 about here

In line with our previous results, the results in Table 6 show that the board education variable is significant only when the bank risk is measured through the Z-index and σ(ROA), while it is not significant when the dependent variable is the credit risk. In column 1, we note that the coefficient of board education is significant and negatively associated with bank stability (β = -2.931, p < 0.1%). In column 2, the coefficient of board education is significant and positively associated with profit volatility (β = 2.101, p < 1%). Therefore, we conclude that in cooperative banks, stability and profit volatility are significantly associated with board education. Specifically, an increase in board education leads to higher cooperative bank risk-taking in terms of both lower bank stability and higher profit volatility. Overall, this result suggests that an increase in board education likely leads cooperative banks to engage in more risk-taking behavior.

This finding led us to conclude that board education drives our previous results, not the potential structural differences between the two institutional settings. In Table 7, we show the results obtained by including Italian Popular Banks in our sample.

Insert Table 7 about here

In Table 7, we highlight that the estimates are quite similar to previous results (Table 5).

Furthermore, we re-estimated our models by adopting the ratio of risk-weighted assets to total assets (RWA/TA) as an alternative measure of bank risk. Consistent with the evidence for our proxy of credit risk-taking, we find that the mediating role of board education on RWA exposure is weaker. This finding can be explained by the fact that on average, credit risk requirements are much higher than for any other risk considered in Pillar 1 (market and operational risk).

Moreover, we re-estimated the previous models by excluding listed banks for two reasons. First, in Italy, listed banks are larger banks. Second, given that i) listed banks tend to be under stricter regulation and market discipline – which may "externally" require specific board characteristics (e.g., a higher education) – and ii) cooperative banks are not listed because their fundamental characteristics do not allow their shares to be traded, we decided to exclude listed banks to compare cooperative banks only with unlisted joint-stock banks, as neither are exposed to the disciplining power of the stock market. Therefore, by excluding listed banks, we have a more homogeneous sample. Unreported model estimations on the sample of unlisted banks confirm the previous results for all proxies of bank risk.

We also re-estimated the previous models to control for time-varying regional heterogeneity by including the interaction between year and regional fixed effects. The interaction between year and regional dummies captures relevant territorial dynamics not included in the control variables, such as changing conditions at the local level or shocks that may affect these areas differently, for instance, in terms of the local banking system and education levels. Additionally, in this case, the results are coherent with previous results.

All the tables related to the robustness tests that are not reported here are available upon request.

6. Discussion and conclusions

Although bank governance is a subject of wide debate in the literature, to the authors' knowledge, no empirical study to date has focused on the relationship between bank institutional setting (by distinguishing between cooperative and joint-stock banks) and risk-taking behavior by exploring the underlying board-level mechanisms (education and turnover). In this paper, we analyze how board characteristics in terms of education and turnover affect decision making about risk.

The distinction between cooperative and joint-stock banks is important not only to adequately assess the effect of board dynamics on risk-taking, given the different business models and objectives that these two types of banks entail, but also to clarify whether such differences are substantial enough to justify claims that they have different corporate governance standards. Furthermore, we highlight that unlike the current literature that uses listed companies to analyze the relationship between board education and risk-taking, we use a large dataset of mainly small and unlisted banks. Although this choice has not allowed us to have highly detailed variables, our study sheds new light on the governance of cooperative banks, which is a topic largely ignored by the empirical literature.

Our first result shows that cooperative banks take less risk than joint-stock banks, as suggested in the theoretical literature. Second, we show that these two types of banks are quite different in terms of their board characteristics, as cooperative banks have lower board turnover and educational levels than joint-stock banks; both board turnover and board education level are commonly considered to indicate weak governance. Our third result shows that cooperative banks' lower risk-taking is driven by the lower educational level of the directors on the board. Notably, the result is not confirmed for credit risk-taking but only for measures of total risk. A comprehensive interpretation of these results leads to the conclusion that in cooperative banks, a lower level of education among board members leads to a lower exposure to total risk and, in turn, to more stable performance. Overall, our evidence supports the previous literature on board education and risk-taking and extends the research examining bank institutional settings and the role of specific aspects of board governance on bank risk-taking. An interpretation consistent with our results is that in cooperative banks, less-educated directors may not undertake projects whose risks cannot be understood or even accessed (knowledge barrier) by management. By contrast, joint-stock banks, which are characterized by stronger incentives to maximize shareholder value and more educated boards, tend to undertake more of these sophisticated risks. Moreover, more educated directors could participate in more risk-taking activities due to their understanding of complex financial instruments (Minton et al., 2014). These explanations are relevant for policy makers because they are engaged in governance reforms of financial institutions. However, the competences and experience accumulated within the organization may be more relevant for credit risk than those of the board. Indeed, while we expect that the credit risk appetite is defined at the board level, the actual exposure to credit risk depends on the abilities to handle the relationships with customers/borrowers and/or to assess their creditworthiness, and in small cooperative banks, we expect that these abilities are more effective, given the closeness of the relationship with customers and the great deal of soft information. In fact, for banks that are more local and whose activity is based mainly on relationship lending, the influence of board education on risk-taking disappears, suggesting a prominent role of built-in experience, for instance, through the definition of internal credit policies to process soft and hard information, as a determinant of risk-taking. In addition, the analysis has revealed the relevance of the focus on institutional settings (cooperative as opposed to joint-stock status) for corporate governance standards.

This study has several implications. The recent global financial crisis has renewed the debate on bank risk-taking and on how to improve corporate governance in banking (Laeven and Levine, 2009). In particular, a stronger role of the board of directors has been discussed as a potential mechanism to prevent excessive risk-taking. Overall, our empirical evidence offers useful insights for the debate on improving corporate governance in banking while taking into account different institutional settings, contributing to the post-crisis industry and policy debate on this topic. The relevance of this debate lies in the key role of the banking industry in economic growth and financial stability, especially in countries such as Italy, where banks represent the main type of external financing for large firms and small and medium enterprises and where cooperative banks are often the only banks operating in more rural areas. From a policy perspective, the proposal of different standards for cooperative banks based on their "better" governance should consider the diversity of the cooperative banking system, such that large cooperative banks may eventually lose their focus on relationships with customers and engage in new activities and businesses that make them resemble – and even make them riskier than – joint-stock banks from a risk-taking perspective.

Finally, we are aware that our proxy for board education is not perfect, but we believe that it supports the investigation of the role of education as a proxy for knowledge base and behavioral style. Although a rapidly growing literature emphasizes that while the impact of education on firm performance is not homogenous, it varies with degree type (Bertrand & Schoar, 2003; Berger et al., 2014; King et al., 2016) and that 'elite' education matters, we believe that our proxy for board education is relevant to assess the impact of education per se rather than qualifications. We cannot observe qualification levels or types of education, but had these been more important, we would have found insignificant results for our variable. In contrast, the board education variable is significant in our models, and our results are robust to several specifications.

ENDNOTES

[1] The Supervisory Authority (in Italy the Bank of Italy) has the power to replace the board of directors when the bank is under special measures. In this case, the Authority will call two "extraordinary administrators" to manage the bank and set up an audit committee to supervise them. Therefore, the owners of the bank have no longer control over the bank as long as the "extraordinary administration" process is completed. Only then, the owners will elect a new board of directors. Moreover, the bank balance sheet will report aggregate financial information for the entire period of the "extraordinary administration" (usually, about 2 years). This means that we cannot rely on balance sheet information after the bank enters the extraordinary administration.

REFERENCES

Alexopoulos, Y., Catturani, I., & Goglio, S. (2013). Searching for a model of governance in cooperative banking. In D. Brazda, J., Dellinger, M., Rößl (Ed.), *Bestandsaufnahme und Ausgangssituation* (pp. 707–731). Wien: Lit Verlag.

Allemand, I., Brullebaut, B., & Raimbault, S. (2013). Exploring the Role of the Board of Directors in Cooperatives: Lessons for Microfinance. *Strategic Change*, *22*(1–2), 79–93. https://doi.org/10.1002/jsc.1923

Anderson, R. C., & Fraser, D. R. (2000). Corporate control, bank risk taking, and the health of the banking industry. *Journal of Banking & Finance*, *24*(8), 1383–1398. https://doi.org/10.1016/S0378-4266(99)00088-6

Andres, P. De, & Vallelado, E. (2008). Corporate governance in banking: The role of the board of directors. *Journal of Banking and Finance*, *32*(12), 2570–2580. https://doi.org/10.1016/j.jbankfin.2008.05.008

Audretsch, D. B., & Lehmann, E. E. (2005). The Effects of Experience, Ownership, and Knowledge on IPO Survival: Empirical Evidence from Germany. *Review of Accounting and Finance*, *4*(4), 13–33. https://doi.org/10.1108/eb043435

Bank of Italy. 2018. Statistical Database, https://infostat.bancaditalia. it/giava-inquiry-public/flex/Giava/GIAVAFEInquiry.html#, accessed on 05/10/2018.

Bantel, K. A., & Jackson, S. E. (1989). Top management and innovations in banking: Does the composition of the top team make a difference? *Strategic Management Journal*, *10*, 107–124. https://doi.org/10.1002/smj.4250100709

Baran, L., & Forst, A. (2015). Disproportionate insider control and board of director characteristics. *Journal of Corporate Finance*, *35*, 62–80. https://doi.org/10.1016/j.jcorpfin.2015.08.006

Baron, R. M., & Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182. https://doi.org/10.1093/alcalc/34.2.197

Basel Committee on Banking Supervision. (2015). *Guidelines on Corporate governance principles for banks*. Retrieved from http://www.bis.org/bcbs/publ/d328.pdf

Battistin, E., Graziano, C., & Parigi, B. M. (2012). Connections and performance in bankers' turnover. *European Economic Review*, *56*(3), 470–487. https://doi.org/10.1016/j.euroecorev.2011.11.006

Beber, A., & Fabbri, D. (2012). Who times the foreign exchange market? Corporate speculation and CEO characteristics. *Journal of Corporate Finance*, *18*(5), 1065–1087. https://doi.org/10.1016/j.jcorpfin.2012.07.004

Becchetti, L., Garcia, M. M., & Trovato, G. (2011). Credit Rationing and Credit View: Empirical Evidence from an Ethical Bank in Italy. *Journal of Money, Credit and Banking*, *43*(6), 1217–1245. https://doi.org/10.1111/j.1538-4616.2011.00423.x

Beck, T., Behr, P., & Guettler, A. (2013). Gender and banking: Are women better loan officers? *Review of Finance*, *17*(4), 1279–1321. https://doi.org/10.1093/rof/rfs028

Beck, T., De Jonghe, O., & Schepens, G. (2013). Bank competition and stability: Cross-country heterogeneity. *Journal of Financial Intermediation*, *22*(2), 218–244. https://doi.org/10.1016/j.jfi.2012.07.001

Beck, T., Hesse, H., Kick, T., & von Westernhagen, N. (2009). Bank Ownership and Stability: Evidence from Germany. *Unpublished Working Paper (Washington, DC: Federal Deposit Insurance Corporation)*, (April 2009), 1–61. Retrieved from https://fdic.gov/bank/analytical/cfr/2009/june/CFR_SS_2009_beck.pdf

Bellucci, A., Borisov, A., & Zazzaro, A. (2010). Does gender matter in bank-firm relationships? Evidence from small business lending. *Journal of Banking and Finance*, *34*(12), 2968–2984. https://doi.org/10.1016/j.jbankfin.2010.07.008

Berger, A. N., Kick, T., & Schaeck, K. (2014). Executive board composition and bank risk taking. *Journal of*

Corporate Finance, *28*, 48–65. https://doi.org/10.1016/j.jcorpfin.2013.11.006

Berger, A. N., Miller, N. H., Petersen, M. A., Rajan, R. G., & Stein, J. C. (2005). Does function follow organizational form? Evidence from the lending practices of large and small banks. *Journal of Financial Economics*, *76*(2), 237–269. https://doi.org/10.1016/j.jfineco.2004.06.003

Bertrand, M., & Mullainathan, S. (2003). Enjoying the Quiet Life? Corporate Governance and Managerial Preferences. *Journal of Political Economy*, *111*(5), 1043–1075. https://doi.org/10.1086/376950

Bertrand, M., & Schoar, A. (2003). Managing with Style: The Effect of Managers on Firm Policies. *The Quarterly Journal of Economics*, *118*(4), 1169–1208. https://doi.org/10.1162/003355303322552775

Bhagat, S., & Black, B. (2002). The Non-Correlation Between Board Independence and Long Term Firm Performance. *Journal of Corporation Law*, *27*(2), 231–273. https://doi.org/10.2139/ssrn.133808

Biao, X., N. Davidson, W., & J. DaDalt, P. (2003). Earnings Management and Corporate Governance: The Roles of the Board and the Audit Committee. *Journal of Corporate Finance, 9(3), 295-316.*, *9*(404), 1–32.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Bofondi, M., & Gobbi, G. (2006). Informational barriers to entry into credit markets. *Review of Finance*. https://doi.org/10.1007/s10679-006-6978-2

Bond, S. S., Hoeffler, A., & Temple, J. (2001). GMM estimation of empirical growth models. *Economics Papers, Economics Group, Nuffield College: University of Oxford*, *W21*(01), 33. https://doi.org/10.1016/S0165-1765(02)00083-6

Borgen, S. O. (2004). Rethinking incentive problems in cooperative organizations. *Journal of Socio-Economics*, *33*(4), 383–393. https://doi.org/10.1016/j.socec.2004.04.010

Boubakri, N., Dionne, G., & Triki, T. (2008). Consolidation and value creation in the insurance industry: The role of governance. *Journal of Banking and Finance*, *32*(1), 56–68. https://doi.org/10.1016/j.jbankfin.2007.09.004

Boyd, B. K. (1994). Board Control and CEO Compensation. *Strategic Management Journal*, *15*(5), 335–344. https://doi.org/10.1002/smj.4250150502

Boyd, J. H., & De Nicoló, G. (2005). The theory of bank risk taking and competition revisited. *Journal of Finance*, *60*(3), 1329–1343. https://doi.org/10.1111/j.1540-6261.2005.00763.x

Boytsun, A., Deloof, M., & Matthyssens, P. (2011). Social Norms, Social Cohesion, and Corporate Governance. *Corporate Governance: An International Review*, *19*(1), 41–60. https://doi.org/10.1111/j.1467-8683.2010.00829.x

Camerer, C., & Lovallo, D. (1999). Overconfidence and excess entry: An experimental approach. *American Economic Review*, *89*(1), 306–318. https://doi.org/10.1257/aer.89.1.306

Chaddad, F. R., & Cook, M. L. (2004). Understanding new cooperative models: An ownership-control rights typology. *Review of Agricultural Economics*, *26*(3), 348–360. https://doi.org/10.1111/j.1467-9353.2004.00184.x

Chaganti, R. S., Mahajan, V., & Sharma, S. (1985). Corporate Board Size, Composition and Corporate Failures in Retailing Industry. *Journal of Management Studies*, *22*(4), 400–417. https://doi.org/10.1111/j.1467-6486.1985.tb00005.x

Cole, R. A., Goldberg, L. G., & White, L. J. (2004). Cookie Cutter vs. Character: The Micro Structure of Small Business Lending by Large and Small Banks. *Journal of Financial and Quantitative Analysis*, *39*(02), 227. https://doi.org/10.1017/S0022109000003057

Colombelli, A. (2015). Top management team characteristics and firm growth. *Journal of Entrepreneurial Behavious and Research*, *21*(1), 107–127. https://doi.org/10.1108/ IJEBR-12-2013-0209

Cornforth, C. (2004). The Governance of cooperatives and mutual associations: A paradox perspective. *Annals of Public and Cooperative Economics*, *75*(1), 11–32. https://doi.org/10.1111/j.1467-8292.2004.00241.x

Davis, P. (2001). The Governance of Co-operatives under Competitive Conditions: Issues, Processes and Culture. *Corporate Governance: The International Journal of Business in Society*. https://doi.org/10.1108/EUM0000000005975

De Nicoló, G., Jalal, A. M., & Boyd, J. H. (2006). Bank Risk-Taking and Competition Revisited: New Theory and New Evidence. *IMF Working Papers*, *06*(297), 1. https://doi.org/10.5089/9781451865578.001

Delis, M. D., Hasan, I., & Tsionas, E. G. (2014). The risk of financial intermediaries. *Journal of Banking & Finance*, *44*(March), 1–12. https://doi.org/10.1016/j.jbankfin.2014.03.024

Delis, M. D., & Kouretas, G. P. (2011). Interest rates and bank risk-taking. *Journal of Banking and Finance*, *35*(4), 840–855. https://doi.org/10.1016/j.jbankfin.2010.09.032

Delis, M. D., & Staikouras, P. (2009, August 17). On-site audits, sanctions, and bank risk-taking: An empirical overture towards a novel regulatory and supervisory philosophy. Retrieved from https://mpra.ub.uni-muenchen.de/16836/1/MPRA_paper_16836.pdf

Delis, M. D., & Staikouras, P. K. (2011). Supervisory effectiveness and bank risk. *Review of Finance*, *15*, 511–543. https://doi.org/10.1093/rof/rfq035

Dyck, A., Morse, A., & Zingales, L. (2010). Who blows the whistle on corporate fraud? *Journal of Finance*, *65*(6), 2213–2253. https://doi.org/10.1111/j.1540-6261.2010.01614.x

Eldenburg, L., Hermalin, B. E., Weisbach, M. S., & Wosinska, M. (2004). Governance, performance objectives and organizational form: Evidence from hospitals. *Journal of Corporate Finance*, *10*(4), 527–548. https://doi.org/10.1016/S0929-1199(03)00031-2

European Association of Co-operative Banks. (2012). EACB Contribution to the Consultation by the High Level Expert Group on reforming the structure of the EU Banking Sector. Retrieved from http://ec.europa.eu/internal_market/consultations/2012/banking_sector/registered-organisations/european-association-cooperative-banks_en.pdf

European Association of Co-operative Banks. (2015). EACB Note on BCBS Guidelines on Corporate Governance Principles for Banks, 1–9. Retrieved from http://www.globalcube.net/clients/eacb/content/medias/publications/position_papers/Corporate_Governance/150109_EACB_note_on_BCBS_review_of_Corporate_Governance_Principles_final.pdf

Fahlenbrach, R., & Stulz, R. M. (2011). Bank CEO incentives and the credit crisis. *Journal of Financial Economics*, *99*(1), 11–26. https://doi.org/10.1016/j.jfineco.2010.08.010

Fama, E. F. (1980). Agency Problems and the Theory of the Firm. *Journal of Political Economy*, *88*(2), 288–307. https://doi.org/10.2307/1837292

Fiordelisi, F., & Mare, D. S. (2013). Probability of default and efficiency in cooperative banking. *Journal of International Financial Markets, Institutions and Money*, *26*(1), 30–45. https://doi.org/10.1016/j.intfin.2013.03.003

Fonteyne, W. (2007). *Cooperative Banks in Europe— Policy Issues* (Working Paper No. 07/159). Retrieved from https://www.imf.org/external/pubs/ft/wp/2007/wp07159.pdf

Forbes, D. P., & Milliken, F. J. (2008). Cognition and corporate governance: Understanding boards of directors as strategic decision making groups. In *The Value Creating Board: Corporate Governance and Organizational Behaviour* (pp. 190–217). https://doi.org/10.4324/9780203888711

Frank, M. Z., & Goyal, V. K. (2007). Corporate Leverage: How Much Do Managers Really Matter? *SSRN Electronic Journal*, 1–38. https://doi.org/10.2139/ssrn.971082

Franks, J., Mayer, C., & Renneboog, L. (2001). Who Disciplines Management in Poorly Performing Companies? *Journal of Financial Intermediation*, *10*(3–4), 209–248. https://doi.org/10.1006/jfin.2001.0317

García-Marco, T., & Robles-Fernández, M. D. (2008). Risk-taking behaviour and ownership in the banking industry: The Spanish evidence. *Journal of Economics and Business*, *60*(4), 332–354. https://doi.org/10.1016/j.jeconbus.2007.04.008

Giagnocavo, C., Gerez, S., & Sforzi, J. (2012). Cooperative bank strategies for social-economic problem solving: Supporting social enterprise and local development. *Annals of Public and Cooperative Economics*, *83*(3), 281–315. https://doi.org/10.1111/j.1467-8292.2012.00464.x

Gorton, G., & Schmid, F. (1999). Corporate governance, ownership dispersion and efficiency: Empirical evidence from Austrian cooperative banking. *Journal of Corporate Finance*, *5*(2), 119–140. https://doi.org/10.1016/S0929-1199(98)00019-4

Groeneveld, H., & de Vries, B. (2009). European co-operative banks : First lessons of the subprime crisis. *The International Journal of Cooperative Management*, *4*(2), 8–21.

Guiso, L., Sapienza, P., & Zingales, L. (2009). Does local financial development matter? In *The Banks and the Italian Economy* (pp. 31–66). https://doi.org/10.1007/978-3-7908-2112-3_3

Hambrick, D. C., & Mason, P. A. (1984). Upper Echelons: The Organization as a Reflection of Its Top Managers. *Academy of Management Review*, *9*(2), 193–206. https://doi.org/10.5465/AMR.1984.4277628

Hansmann, H. (2000). *The ownership of enterprise*. Cambridge (MA): Harvard University Press.

Hardesty, S. D. (2005). Cooperatives as Marketers of Branded Products. *Journal of Food Distribution Research*, *36*(1), 237–242.

Harris, M., & Raviv, A. (2008). A theory of board control and size. *Review of Financial Studies*, *21*(4), 1797–1832. https://doi.org/10.1093/rfs/hhl030

Harrison, J. R., Torres, D. L., & Kukalis, S. (1988). The changing of the guard: Turnover and structural change in the top-management positions. *Administrative Science Quarterly*, *33*(2), 211–232. https://doi.org/10.2307/2393056

Hart, O., & Moore, J. (1998). *Cooperatives vs. outside ownership*. *NBER Working paper* (Vol. 6421). https://doi.org/10.3386/w6421

Hermalin, B. E., & Weisbach, M. S. (2003). Boards Of Directors as an Endogenously Determined Institution: A Survey of the Economic Literature. *Economic Policy Review*, *9*(1), 7–26. https://doi.org/10.2139/ssrn.233111

Herrmann, P., & Datta, D. K. (2005). Relationships between top management team characteristics and international diversification: An empirical investigation. *British Journal of Management*, *16*(1), 69–78.

https://doi.org/10.1111/j.1467-8551.2005.00429.x
Hung, H. (1998). A typology of the theories of the roles of governing boards. *Corporate Governance: An International Review*, *6*(2), 101–111. https://doi.org/10.1111/1467-8683.00089
Jassaud, N. (2014). *Reforming the Corporate Governance of Italian Banks* (IMF Working Paper No. WP/14/181). Retrieved from https://www.imf.org/external/pubs/cat/longres.aspx?sk=42373.0
Jiang, Y., & Peng, M. W. (2011). Are family ownership and control in large firms good, bad, or irrelevant? *Asia Pacific Journal of Management*, *28*(1), 15–39. https://doi.org/10.1007/s10490-010-9228-2
Jiménez, G., Ongena, S., Peydró, J.-L., & Saurina, J. (2014). Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say About The Effects of Monetary Policy on Credit Risk-Taking? *Econometrica*, *82*(2), 463–505. https://doi.org/10.3982/ECTA10104
Kang, J. K., & Shivdasani, A. (1995). Firm performance, corporate governance, and top executive turnover in Japan. *Journal of Financial Economics*, *38*(1), 29–58. https://doi.org/10.1016/0304-405X(94)00807-D
Kaplan, S. N. (1994). Top executives, turnover, and firm performance in Germany. *Journal of Law, Economics, and Organization*, *10*(1), 142–159. https://doi.org/10.1093/jleo/10.1.142
Keeling, J. J. (2004). Lessons in Cooperative Failure: The Rice Growers Association Experience. *Agricultural Research in Economics*, *7*(3), 1–5.
Kesner, I. F. (1988). Directors' Characteristics and Committee Membership: an Investigation of Type, Occupation, Tenure, and Gender. *The Academy of Management Journal*, *31*(1), 66–84. https://doi.org/10.2307/256498
King, T., Srivastav, A., & Williams, J. (2016). What's in an education? Implications of CEO education for bank performance. *Journal of Corporate Finance*, *37*, 287–308. https://doi.org/10.1016/j.jcorpfin.2016.01.003
Klein, A. (1998). Firm performance and board comittee structure. *The Journal of Law & Economics*, *41*(1), 275–304. https://doi.org/10.1086/467391
Köhler, M. (2014). Which banks are more risky? The impact of business models on bank stability. *Journal of Financial Stability*, *16*, 195–212. https://doi.org/10.1016/j.jfs.2014.02.005
Konishi, M., & Yasuda, Y. (2004). Factors affecting bank risk taking: Evidence from Japan. *Journal of Banking & Finance*, *28*(1), 215–232. https://doi.org/10.1016/S0378-4266(02)00405-3
Krivogorsky, V., & Eichenseher, J. W. (2005). Effects of Top Management Replacement on Firms' Behavior: Empirical Analysis of Russian Companies. *Management International Review*, *45*(4), 437–458.
Kumar, P., & Zattoni, A. (2018). Corporate governance, boards of directors, and firm performance: Avenues for future research. *Corporate Governance: An International Review*, *26*(6), 394–396. https://doi.org/10.1111/corg.12262
Laeven, L., & Levine, R. (2009). Bank governance, regulation and risk taking. *Journal of Financial Economics*, *93*(2), 259–275. https://doi.org/10.1016/j.jfineco.2008.09.003
Lang, M., Lins, K. V., & Maffett, M. (2012). Transparency, Liquidity, and Valuation: International Evidence on When Transparency Matters Most. *Journal of Accounting Research*, *50*(3), 729–774. https://doi.org/10.1111/j.1475-679X.2012.00442.x
Lester, R. H., Certo, S. T., Dalton, C. M., Dalton, D. R., & Cannella, A. A. (2006). Initial public offering investor valuations: An examination of top management team prestige and environmental uncertainty. *Journal of Small Business Management*, *44*(1), 1–26. https://doi.org/10.1111/j.1540-627X.2006.00151.x
Lins, K. V., Volpin, P., & Wagner, H. F. (2013). Does family control matter? International evidence from the 2008-2009 financial crisis. *Review of Financial Studies*. https://doi.org/10.1093/rfs/hht044
Liu, Y., Wang, L. C., Zhao, L., & Ahlstrom, D. (2013). Board turnover in Taiwan's public firms: An empirical study. *Asia Pacific Journal of Management*, *30*(4), 1059–1086. https://doi.org/10.1007/s10490-013-9363-7
Mehran, H., Morrison, A., & Shapiro, J. (2012). Corporate Governance and Banks: What Have We Learned from the Financial Crisis? In M. Dewatripont & X. Freixas (Eds.), *The Crisis Aftermath: New Regulatory Paradigms* (pp. 11–44). London: Centre for Economic Policy Research (CEPR). Retrieved from http://voxeu.org/sites/default/files/file/Crisis_Aftermath.pdf
Miller, J. L. (2002). The board as a monitor of organizational activity: The applicability of agency theory to nonprofit boards. *Nonprofit Management and Leadership*, *12*, 429–450. https://doi.org/10.1002/nml.12407
Minton, B. A., Taillard, J. P., & Williamson, R. (2014). Financial Expertise of the Board, Risk Taking, and Performance: Evidence from Bank Holding Companies. *Journal of Financial & Quantitative Analysis*, *49*(2), 351–380. https://doi.org/10.1017/S0022109014000283
Mizruchi, M. S., & Stearns, L. B. (1988). A Longitudinal Study of the Formation of Interlocking Directorates. *Administrative Science Quarterly*, *33*(2), 194–210. https://doi.org/Article
Nakano, M., & Nguyen, P. (2012). Board Size and Corporate Risk Taking: Further Evidence from Japan. *Corporate Governance (Oxford)*, *20*(4), 369–387. https://doi.org/10.1111/j.1467-8683.2012.00924.x
Nicols, A. (1967). Property rights and behavior: Stock versus mutual Savings and Loan Associations: Some

evidence of differences in behavior. *American Economic Review*, *57*(3), 337–346.
Palvia, A., Vähämaa, E., & Vähämaa, S. (2014). Are Female CEOs and Chairwomen More Conservative and Risk Averse? Evidence from the Banking Industry During the Financial Crisis. *Journal of Business Ethics*, *131*(3), 577–594. https://doi.org/10.1007/s10551-014-2288-3
Pathan, S. (2009). Strong boards, CEO power and bank risk-taking. *Journal of Banking and Finance*, *33*(7), 1340–1350. https://doi.org/10.1016/j.jbankfin.2009.02.001
Pevzner, M., Xie, F., & Xin, X. (2015). When firms talk, do investors listen? The role of trust in stock market reactions to corporate earnings announcements. *Journal of Financial Economics*, *117*(1), 190–223. https://doi.org/10.1016/j.jfineco.2013.08.004
Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*, *9*(1), 86–136. https://doi.org/The Stata Journal
San-Jose, L., Retolaza, J. L., & Gutierrez-Goiria, J. (2011). Are Ethical Banks Different? A Comparative Analysis Using the Radical Affinity Index. *Journal of Business Ethics*, *100*(1), 151–173. https://doi.org/10.1007/s10551-011-0774-4
Saunders, A., Strock, E., & Travlos, N. G. (1990). Ownership Structure, Deregulation, and Bank Risk Taking. *The Journal of Finance*, *45*(2), 643–654. https://doi.org/10.1111/j.1540-6261.1990.tb03709.x
Schaeck, K., & Cihák, M. (2014). Competition, Efficiency, and Stability in Banking. *Financial Management*, *43*(1), 215–241. https://doi.org/10.1111/fima.12010
Schulze, W. S., Lubatkin, M. H., Dino, R. N., & Buchholtz, A. K. (2001). Agency Relationships in Family Firms: Theory and Evidence. *Organization Science*, *12*(2), 99–116. https://doi.org/10.1287/orsc.12.2.99.10114
Schwizer, P., & Stefanelli, V. (2011). Governance e controlli interni. In A. Carretta (Ed.), *Il credito cooperativo. Storia, diritto, economia, organizzazione* (pp. 479–518). Bologna: Il Mulino.
Servin, R., Lensink, R., & van den Berg, M. (2012). Ownership and technical efficiency of microfinance institutions: Empirical evidence from Latin America. *Journal of Banking and Finance*, *36*(7), 2136–2144. https://doi.org/10.1016/j.jbankfin.2012.03.018
Shaw, L. (2006). Overview of Corporate Governance Issues for Co-operatives. *Global Corporate Governance Forum*, (November 2006), 1–40.
Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, *13*(1982), 290–312. https://doi.org/10.2307/270723
Spear, R. (2004). Governance in Democratic Member-Based Organisations. *Annals of Public and Cooperative Economics*, *75*(1), 33–60. https://doi.org/10.1111/j.1467-8292.2004.00242.x
Stefancic, M. (2014). Investigating Management Turnover in Italian Cooperative Banks. *Journal of Entrepreneurial and Organizational Diversity*, *3*(1), 131–163. https://doi.org/10.5947/jeod.2014.007
Tarantola, A. M. (2009). Le banche popolari cooperative: profili italiani ed europei. In Bank of Italy (Ed.). Bank of Italy. Retrieved from https://www.bancaditalia.it/pubblicazioni/interventi-direttorio/int-dir-2009/Tarantola_270209.pdf
Vallascas, F., Mollah, S., & Keasey, K. (2017). Does the impact of board independence on large bank risks change after the global financial crisis? *Journal of Corporate Finance*, *44*, 149–166. https://doi.org/10.1016/j.jcorpfin.2017.03.011
Vitaliano, P. (1983). Cooperative Enterprise: An Alternative Conceptual Basis for Analyzing a Complex Institution. *American Journal of Agricultural Economics*, *65*(5), 1078. https://doi.org/10.2307/1240424
Wheelock, D., & Wilson, P. (2000). Why Do Banks Disappear? The Determinants of U.S. Bank Failures and Acquisitions. *The Review of Economics and Statistics*, *82*(1), 127–138. https://doi.org/10.1162/003465300558560
Wiersema, M. F., & Bantel, K. a. (1992). Top Management Team Demography and Corporate Strategic Change. *Academy of Management Journal*, *35*(1), 91–121. https://doi.org/10.2307/256474
Wincent, J., Anokhin, S., & ??rtqvist, D. (2010). Does network board capital matter? A study of innovative performance in strategic SME networks. *Journal of Business Research*, *63*(3), 265–275. https://doi.org/10.1016/j.jbusres.2009.03.012
Wincent, J., Anokhin, S., & Örtqvist, D. (2010). Does network board capital matter? A study of innovative performance in strategic SME networks. *Journal of Business Research*, *63*(3), 265–275. https://doi.org/10.1016/j.jbusres.2009.03.012
Young, M. N., Buchholtz, A. K., & Ahlstrom, D. (2003). How Can Board Members Be Empowered If They Are Spread Too Thin? *SAM Advanced Management Journal (07497075)*, *68*(4), 4–11.

TABLE 1
Number of banks operating in Italy and their branches, classified by institutional setting

	No	%	No of branches	%
Joint-stock banks	147	27%	21,333	78%
Popular banks (Banche Popolari Cooperative)	23	4%	1,629	6%
Cooperative banks (Banche di credito cooperativo)	289	54%	4,257	16%
Foreign banks	79	15%	165	1%
Total	538	100%	27,374	100%

TABLE 2
Summary statistics

Variable	Obs.	Mean	Median	Std. Dev.	Min	Max
Z-index	3489	284.42	68.12	1021.45	1.00	14378.83
σ(ROA)	3489	0.003	0.002	0.08	0	0.17
NPL/Gross Loans	3821	0.09	0.08	0.05	0.01	0.33
Bank size (€/billion)	4161	3,92	0.39	18,7	0.003214	431
Bank age (year)	4161	58.13	50	43.60	0.5	183
Business model (Loans/TA)	4161	0.66	0.70	0.18	0.07	0.99
Bank growth rate	3494	0.09	0.07	0.17	-0.40	2.57
ROE	4160	0.05	0.05	0.08	-0.38	0.41
Board size	4161	9.74	9	2.83	5	24
Gender diversity	4161	0.05	0	0.07	0	0.44
Board turnover	4157	0.12	0	0.20	0	1.42
Board education	4131	0.39	0.33	0.33	0	1

Table 1 presents summary statistics for bank and board characteristics for our sample of Italian banks over the 2011-2017 period. The Z-index measures bank stability. σ(ROA) is the ROA standard deviation. NPL/Gross Loans is the ratio of NPL to Gross Loans. Bank size denotes total bank assets. Bank age denotes the age of a bank. Business model is the ratio of loans to total assets as a proxy for the bank business model. Bank growth rate is the growth rate of assets. ROE is bank profitability. Board size is the number of board members. Gender diversity is the proportion of female members on the board. Board turnover is board member turnover. Board education is the proportion of directors with a university degree.

TABLE 3
Univariate tests of difference between joint-stock and cooperative banks

Variable	Joint-stock Banks	Cooperative Banks	t-value
Z-index (*ln*)	3.96	4.49	-9.77***
σ(ROA) (*ln*)	-6.41	-6.67	4.75***
NPL/Gross loans (*ln*)	-2.82	-2.47	-13.88***
Bank size (*ln*)	21.46	19.32	40.40***
Bank age(*ln*)	2.97	3.90	-26.25***
Business model (Loans/TA)	0.64	0.67	-3.59***
Bank growth rate	0.11	0.08	2.95**
ROE (*ln*)	0.04	0.04	-0.61
Board size (*ln*)	2.33	2.19	13.81***
Gender diversity	0.03	0.05	-7.64***
Board turnover (*ln*)	0.15	0.08	11.78***
Board education	0.77	0.23	77.25***
No of obs.	1294	2867	

Table 2 presents the univariate tests of difference between joint-stock and cooperative banks for different bank and board characteristics. Z-index is the natural logarithm of the Z-index. σ(ROA) is the natural logarithm of the ROA standard deviation. NPL/Gross Loans is the natural logarithm of the ratio of NPL to Gross Loans. Bank size denotes the natural logarithm of total assets. Bank age denotes the natural

logarithm of the age of a bank. Business model is the ratio of loans to total assets as a proxy for the bank business model. Bank growth rate is the growth rate of assets. GDP is gross domestic product. ROE is the natural logarithm of bank profitability. Board size is the natural logarithm of the number of board members. Gender diversity denotes the percentage of female members on the board. Board turnover is the natural logarithm of board member turnover. Board education is the percentage of directors holding a university degree. †, *, **, *** denote significance at the 10%, 5%, 1% and 0.1% levels, respectively.

TABLE 4

Correlation matrix – Pearson coefficients

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Z-index (*ln*)	1												
2. σ(ROA) (*ln*)	-0.95***	1											
3. NPL/Gross Loans (*ln*)	-0.08***	0.08***	1										
4. Bank size (*ln*)	-0.06**	-0.09**	-0.22**	1									
5. Bank age (*ln*)	0.20***	-0.15***	0.11***	-0.07***	1								
6. Business model	0.13***	-0.14***	0.03†	0.15***	0.16***	1							
7. Bank growth rate	-0.09**	0.06***	-0.16***	-0.02	-0.23***	-0.18**	1						
8. Regional GDP growth	0.17***	-0.16**	-0.14***	-0.02	0.01	0.06**	-0.06**	1					
9. ROE (*ln*)	0.32***	-0.25***	-0.40***	0.11***	0.07***	-0.09***	0.04*	0.13***	1				
10. Board size (*ln*)	-0.03	-0.03†	-0.09**	0.49***	-0.16***	0.09***	0.01	-0.02	0.04**	1			
11. Gender diversity	-0.01	-0.0004	0.09***	-0.04**	0.08***	0.04*	-0.02	-0.06***	-0.06**	0.01	1		
12. Board turnover (*ln*)	-0.12***	0.09***	0.04*	0.10***	-0.18***	-0.06***	0.03†	-0.02	-0.11***	0.07***	0.08***	1	
13. Board education	-0.22***	0.15***	-0.17***	0.50***	-0.38***	-0.20***	0.07***	-0.04**	-0.03*	0.19***	-0.05**	0.20***	1

Table 3 presents the correlation coefficients between different bank and board characteristics. Z-index is the natural logarithm of the Z-index. σ(ROA) is the natural logarithm of the ROA standard deviation. NPL/Gross Loans is the natural logarithm of the ratio of NPL to Gross Loans. Bank size denotes the natural logarithm of total assets. Bank age denotes the natural logarithm of the age of a bank. Business model is the ratio of loans to total assets as a proxy for the bank business model. Bank growth rate is the growth rate of assets. Regional GDP growth is gross domestic product growth rate at region level (20). ROE is the natural logarithm of bank profitability. Board size is the natural logarithm of the number of board members. Gender diversity denotes the percentage of female members on the board. Board turnover is the natural logarithm of board member turnover. Board education is the percentage of directors holding a university degree. †, *, **, *** denote significance at the 10%, 5%, 1% and 0.1% levels, respectively.

TABLE 5

Mediation analysis of board characteristics on the relationship between risk and bank institutional setting – GMM estimation

Dependent	Board Turnover	Board Education	Z-index	Z-index	Z-index	Z-index	σ(ROA)	σ(ROA)	σ(ROA)	σ(ROA)	NPL	NPL	NPL	NPL	NPL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Lagged dependent			0.12***	0.12***	0.13***	0.12***	0.11**	0.11**	0.11**	0.11**	0.94***	0.94***	0.94***	0.94***	0.94***
			(3.34)	(3.48)	(3.56)	(3.46)	(3.09)	(3.07)	(2.94)	(3.01)	(17.45)	(17.93)	(18.15)	(17.96)	(18.16)
Bank size	0.002	0.03***	0.69**	0.43*	0.45†	0.41	-0.70*	-0.50*	-0.51*	-0.54*	0.001	-0.01	0.001	0.002	-0.01
	(0.82)	(5.79)	(2.63)	(2.10)	(1.89)	(1.49)	(-2.49)	(-2.51)	(-2.41)	(-2.19)	(0.10)	(-0.32)	(0.09)	(0.24)	(-1.16)
Bank age	-0.002	-0.02***	0.021	0.10	0.08	0.06	0.003	-0.03	-0.05	-0.01	-0.01	-0.01	-0.01†	-0.01†	-0.01†
	(-0.85)	(-4.24)	(0.25)	(1.05)	(1.25)	(0.92)	(0.03)	(-0.32)	(-0.81)	(-0.14)	(-1.64)	(-0.68)	(-1.80)	(-1.86)	(-1.80)
Business model	-0.03	-0.19***	4.50**	0.71	1.98	0.38	-3.62*	-0.31	-1.80	-0.50	0.22***	0.22***	0.22***	0.20***	0.19***
	(-1.27)	(-6.43)	(2.60)	(0.46)	(1.30)	(0.22)	(-2.02)	(-0.19)	(-1.27)	(-0.29)	(3.82)	(3.60)	(4.16)	(3.67)	(3.37)
Bank growth rate			0.65†	0.14	0.28	0.057	-0.80*	-0.37	-0.54†	-0.38					
			(1.73)	(0.44)	(0.99)	(0.19)	(-2.02)	(-1.06)	(-1.78)	(-1.14)					
Listed bank	0.02	0.06*	-0.01	-0.38	-0.11	-0.24	0.31	0.55	0.38	0.49†	0.002	-0.01	0.01	0.01	0.03
	(0.71)	(2.10)	(-0.04)	(-0.91)	(-0.39)	(-0.84)	(0.83)	(1.33)	(1.29)	(1.69)	(0.06)	(-0.18)	(0.11)	(0.26)	(0.63)
M&A			-0.42	-0.44†	-0.28	-0.38†	0.52†	0.50*	0.38	0.50*					
			(-1.39)	(-1.79)	(-1.14)	(-1.65)	(1.79)	(2.02)	(1.59)	(2.22)					
Performance	-0.26*	-0.30**													
	(-2.59)	(-3.10)													
Abnormal NPL			-0.66***	-0.69***	-0.74***	-0.68***	0.56***	0.56***	0.60***	0.56***					
			(-4.20)	(-5.11)	(-5.02)	(-5.15)	(3.91)	(4.39)	(4.40)	(4.37)					
Regional GDP growth			10.22***	11.46***	8.71**	11.10***	-8.50**	-9.10***	-7.56**	-9.05***	-1.04*	-1.08*	-1.02*	-1.03*	-0.94†
			(3.34)	(4.46)	(3.21)	(4.40)	(-3.02)	(-3.48)	(-2.91)	(-3.64)	(-2.14)	(-2.20)	(-2.09)	(-2.10)	(-1.94)
Board size		-0.04*	-1.91	-0.82	-1.83†	-0.88	1.48	0.69	1.25	0.82	0.05*	0.06†	0.05†	0.05†	0,05
		(-2.26)	(-1.43)	(-0.84)	(-1.69)	(-0.83)	(1.21)	(0.72)	(1.33)	(0.82)	(1.98)	(1.74)	(1.90)	(1.73)	(1.64)
Gender diversity			1.42	-0.70	-1.01	-0.83	-0.24	0.88	1.64	1.04	-0.41	-0.31	-0.40	-0.32	-0.35
			(0.59)	(-0.37)	(-0.45)	(-0.43)	(-0.10)	(0.46)	(0.80)	(0.54)	(-1.37)	(-1.19)	(-1.35)	(-1.21)	(-1.32)
Executive committee			-0.16	0.031	0.14	0.08	0.17	-0.01	-0.02	-0.005	0.005	0.004	0.01	0.005	-0.001
			(-0.56)	(0.14)	(0.60)	(0.35)	(0.69)	(-0.05)	(-0.10)	(-0.02)	(0.45)	(0.32)	(0.52)	(0.45)	(-0.05)
Independent															
Cooperative	-0.05***	-0.45***	1.46**		1.08*	0.0826	-1.39**		-1.06**	-0.22	-0.0001		-0.004	-0.04	-0.66*
	(-5.46)	(-26.07)	(2.98)		(2.45)	(0.13)	(-2.69)		(-2.63)	(-0.36)	(-0.00)		(-0.17)	(-0.45)	(-2.35)
Cooperative×Bank size															0.03*

															(2.39)
Mediators															
Board turnover				1.00	1.52	1.10		-0.30	-0.63	-0.35		-0.09	-0.10	-0.10	-0.09
				(0.69)	(1.04)	(0.75)		(-0.20)	(-0.42)	(-0.24)		(-0.52)	(-0.55)	(-0.59)	(-0.54)
Board education				-1.77*		-1.95**		1.93*		1.85*		0.07		-0.07	-0.07
				(-2.47)		(-2.72)		(2.39)		(2.22)		(0.40)		(-0.38)	(-0.39)
Constant	0.12†	0.38***	-9.99†	-3.16	-3.67	-2.25	8.38	2.20	3.72	3.02	-0.41*	-0.298	-0.38†	-0.35†	-0.035
	(1.88)	(3.88)	(-1.85)	(-0.78)	(-0.74)	(-0.41)	(1.47)	(0.56)	(0.82)	(0.60)	(-1.98)	(-0.97)	(-1.91)	(-1.73)	(-0.12)
Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Regional FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	2821	2811	2684	2679	2684	2679	2684	2679	2684	2679	3112	3104	3111	3104	3104
F/Wald χ^2	11.41***	287.07***	256.5***	361.8***	315.5***	374.2***	292.7***	347.6***	337.2***	352.3***	4387.9***	4076.0***	4400.6***	4291.4***	4333.9***
Hansen *J*	1.699	1.129	14.81	30.29	29.12	30.50	16.88	29.10	28.82	29.16	28.77	33.75	28.98	32.91	32.65
*H*1			-11.29***	-11.08***	-10.68***	-10.98***	-11.52***	-11.60***	-11.40***	-11.57***	-6.48***	-6.38***	-6.48***	-6.39***	-6.40***
*H*2			0.59	0.30	0.27	0.28	0.55	0.32	0.31	0.337	-0.68	-0.69	-0.68	-0.68	-0.68
No of instruments			50	59	55	60	50	59	55	60	41	48	45	49	50

This table reports the regression (GMM estimator) results of the mediation effect of board turnover and board education on the relationship between cooperative banks and bank risk taking. Bank size denotes the natural logarithm of total assets. Bank age denotes the natural logarithm of the age of a bank. Business model is the ratio of loans to total assets as a proxy for the bank business model. Bank growth rate is the growth rate of assets. Listed bank is a dummy variable equal to 1 if a bank is listed in a stock exchange market. M&A is a dummy variable equal to 1 if a bank acquires another bank in a given year. Abnormal NPL is a dummy variable equal to 1 if the NPL/Gross Loans ratio of a bank is higher or lower than the 90th or 10th percentile, respectively. Regional GDP growth is gross domestic product growth rate at region level (20). Board size is the natural logarithm of the number of board members. Gender diversity denotes the percentage of female members on the board. Executive Committee is a dummy variable equal to 1 if an executive committee exists in a given bank. Cooperative dummy is equal to 1 if a bank is a cooperative and 0 otherwise. Board turnover is the natural logarithm of board member turnover. Board education is the percentage of directors holding a university degree. Year and location dummies control for year and location fixed effects. Z values are reported in parentheses. Standard errors are robust. †, *, **, *** denote significance at the 10%, 5%, 1% and 0.1% levels, respectively.

Table 6

Regression results of bank risk measured through the Z-index, σ(ROA) and NPL/GROSS Loans for the sub-sample of cooperative banks – GMM estimation

Dependent	Z-index	σ(ROA)	NPL
	1	2	3
Lagged dependent	0.0906*	0.0728†	0.938***
	(2.20)	(1.77)	(11.84)
Bank size	0.202	-0.179	0.0354†
	(0.77)	(-0.72)	(1.65)
Bank age	0.0453	-0.0496	-0.0147
	(0.60)	(-0.67)	(-0.88)
Business model	1.199	-2.354†	0.259*
	(0.91)	(-1.91)	(2.57)
Bank growth rate	0.0122	-0.482	
	(0.03)	(-1.13)	
Listed bank	-0.0144	0.310	0.0123
	(-0.04)	(0.83)	(0.26)
M&A	-0.0556	0.151	
	(-0.21)	(0.58)	
Abnormal NPL	-0.566***	0.500***	
	(-3.69)	(3.56)	
Regional GDP growth	11.82***	-8.534**	-0.361
	(4.07)	(-3.08)	(-0.48)
Board size	-1.114	0.692	0.0488
	(-1.32)	(0.85)	(0.68)
Gender diversity	-0.144	0.879	-0.798
	(-0.08)	(0.51)	(-0.98)
Executive committee	0.252	-0.176	0.0115
	(1.50)	(-1.13)	(0.52)
Board turnover	0.593	-0.478	0.568
	(0.40)	(-0.36)	(0.87)
Board education	-2.931***	2.101**	-0.698
	(-3.58)	(2.60)	(-1.28)
Constant	2.003	-2.488	-1.013**
	(0.58)	(-0.77)	(-2.58)
Year dummies	yes	yes	yes
Location dummies	yes	yes	yes
N	1943	1943	2286
Wald χ^2	206.3***	259.4***	2097.6***
Hansen *J*	27.67	27.90	27.35
$\Pi 1$	-9.477***	-9.528***	-6.583***
$\Pi 2$	0.833	0.675	0.482
No of instruments	60	60	41

This table reports the regression (GMM estimator) results for cooperative sample only. Bank size denotes the natural logarithm of total assets. Bank age denotes the natural logarithm of the age of a bank. Business model is the ratio of loans to total assets as a proxy for the bank business model. Bank growth rate is the growth rate of assets. M&A is a dummy variable equal to 1 if a bank acquires another bank in a given year. Abnormal NPL is a dummy variable equal to 1 if the NPL/Gross Loans ratio of a bank is higher or lower than the 90th or 10th percentile, respectively. Regional GDP growth is gross domestic product growth rate at region level (20). Board size is the natural logarithm of the number of board members. Gender diversity denotes the percentage of female members on the board. Executive Committee is a dummy variable equal to 1 if an executive committee exists in a given bank. Board turnover is the natural logarithm of board member turnover. Year and Regional dummies control for year and regional fixed effects. Z values are reported in parentheses. Standard errors are robust. †, *, **, *** denote significance at the 10%, 5%, 1% and 0.1% levels, respectively.

TABLE 7

Mediation analysis of board characteristics on the relationship between risk and bank institutional setting – GMM estimation – Including Popular Banks

Dependent	Board turnover	Board education	Z-index	Z-index	Z-index	Z-index	σ(ROA)	σ(ROA)	σ(ROA)	σ(ROA)	NPL	NPL	NPL	NPL	NPL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Lagged dependent			0.12***	0.12***	0.13***	0.13***	0.11***	0.11**	0.11**	0.11**	0.92***	0.93***	0.93***	0.93***	0.93***
			(3.58)	(3.62)	(3.70)	(3.62)	(3.32)	(3.13)	(3.15)	(3.13)	(16.60)	(17.06)	(17.37)	(17.27)	(17.54)
Bank size	0.003	0.03***	0.78**	0.44*	0.46†	0.32	-0.78*	-0.50**	-0.51*	-0.45	-0.003	-0.01	-0.003	-0.002	-0.02
	(0.96)	(6.22)	(2.75)	(2.12)	(1.77)	(1.04)	(-2.51)	(-2.58)	(-2.16)	(-1.62)	(-0.39)	(-0.59)	(-0.43)	(-0.23)	(-1.40)
Bank age	-0.003	-0.03***	-0.02	0.07	0.05	0.05	0.04	-0.02	-0.02	-0.002	-0.01	-0.01	-0.01†	-0.01†	-0.01†
	(-1.21)	(-4.82)	(-0.18)	(0.69)	(0.73)	(0.69)	(0.46)	(-0.20)	(-0.27)	(-0.03)	(-1.53)	(-0.56)	(-1.73)	(-1.76)	(-1.72)
Business model	-0.04	-0.19***	5.09*	0.45	2.07	-0.47	-4.03†	0.05	-1.71	0.47	0.21***	0.22***	0.22***	0.20***	0.19**
	(-1.47)	(-6.88)	(2.47)	(0.27)	(1.27)	(-0.25)	(-1.82)	(0.03)	(-1.07)	(0.25)	(3.66)	(3.38)	(4.02)	(3.52)	(3.23)
Bank growth rate			0.72†	0.09	0.30	-0.08	-0.82†	-0.30	-0.50	-0.21					
			(1.83)	(0.27)	(1.03)	(-0.25)	(-1.95)	(-0.84)	(-1.64)	(-0.61)					
Listed bank	0.02	0.05*	-0.31	-0.53	-0.27	-0.41	0.56	0.75†	0.52	0.66*	-0.001	-0.02	0.002	0.005	0.02
	(0.89)	(2.28)	(-0.80)	(-1.30)	(-0.98)	(-1.39)	(1.34)	(1.74)	(1.62)	(2.09)	(-0.03)	(-0.33)	(0.04)	(0.11)	(0.43)
M&A			-0.51	-0.38	-0.20	-0.28	0.55†	0.44†	0.28	0.38					
			(-1.52)	(-1.50)	(-0.82)	(-1.19)	(1.65)	(1.71)	(1.11)	(1.61)					
Performance	-0.27**	-0.29**													
	(-2.72)	(-3.09)													
Abnormal NPL			-0.63***	-0.68***	-0.71***	-0.68***	0.55***	0.56***	0.59***	0.56***					
			(-3.93)	(-5.21)	(-4.99)	(-5.37)	(3.59)	(4.47)	(4.32)	(4.49)					
Regional GDP growth			8.67**	9.66***	6.78**	9.23***	-7.00*	-7.58**	-5.55*	-7.26**	-0.93†	-0.99*	-0.92†	-0.96*	-0.88†
			(2.91)	(3.76)	(2.70)	(3.73)	(-2.45)	(-2.89)	(-2.21)	(-2.96)	(-1.91)	(-2.02)	(-1.90)	(-1.97)	(-1.82)
Board size		-0.04*	-2.47*	-1.35	-2.46*	-1.16	1.99†	1.08	1.90*	1.05	0.06*	0.08†	0.06*	0.06*	0.06†
		(-2.28)	(-2.09)	(-1.34)	(-2.25)	(-0.93)	(1.80)	(1.12)	(1.99)	(0.94)	(2.20)	(1.94)	(2.14)	(2.01)	(1.95)
Gender diversity			1.69	-0.61	-0.50	-0.60	-0.55	0.60	0.91	0.59	-0.45	-0.34	-0.44	-0.34	-0.37
			(0.69)	(-0.31)	(-0.22)	(-0.31)	(-0.23)	(0.32)	(0.42)	(0.30)	(-1.48)	(-1.25)	(-1.47)	(-1.30)	(-1.40)
Exec. commit.			-0.12	0.15	0.26	0.23	0.13	-0.11	-0.15	-0.16	0.01	0.004	0.01	0.005	-0.001
			(-0.41)	(0.65)	(1.13)	(1.05)	(0.46)	(-0.50)	(-0.69)	(-0.76)	(0.48)	(0.29)	(0.53)	(0.40)	(-0.08)
Popular bank	-0.06***	-0.06*	0.70*	0.50	0.74***	0.56*	-0.57*	-0.40	-0.58**	-0.46†	-7.56	-7.79	-8.84	-7.88	-8.46
	(-5.26)	(-2.39)	(2.29)	(1.30)	(3.32)	(2.20)	(-2.05)	(-1.06)	(-2.80)	(-1.87)	(-0.76)	(-0.74)	(-0.80)	(-0.78)	(-0.84)
Independent															
Cooperative	-0.05***	-0.44***	1.58**		0.97*	-0.25	-1.49*		-0.94*	0.08	-0.002		-0.01	-0.02	-0.61*
	(-5.50)	(-26.81)	(2.83)		(2.01)	(-0.34)	(-2.47)		(-2.04)	(0.12)	(-0.08)		(-0.28)	(-0.31)	(-2.13)
Cooperative×Bank size															0.03*
															(2.19)
Mediators															
Board turnover				0.59	0.69	0.67		0.27	0.22	0.20		-0.11	-0.11	-0.13	-0.12
				(0.45)	(0.50)	(0.51)		(0.20)	(0.16)	(0.15)		(-0.64)	(-0.66)	(-0.74)	(-0.69)

Board education				-1.78*		-2.13**		1.76*		1.97*		0.10		-0.03	-0.04
				(-2.29)		(-2.88)		(2.22)		(2.28)		(0.54)		(-0.20)	(-0.20)
Constant	0.12*	0.38***	-10.98†	-1.92	-2.27	1.01	9.09	1.12	2.12	-0.25	-0.39†	-0.23	-0.36†	-0.34†	-0.03
	(2.00)	(4.13)	(-1.71)	(-0.46)	(-0.44)	(0.17)	(1.32)	(0.28)	(0.42)	(-0.04)	(-1.91)	(-0.74)	(-1.79)	(-1.66)	(-0.12)
Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Regional FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	2973	2963	2822	2817	2822	2817	2822	2817	2822	2817	3112	3104	3111	3104	3104
Wald χ^2	10.81***	302.50***	258.80***	375.70***	331.60***	383.50***	281.40***	363.40***	342.10***	363.20***	3987.5***	3620.8***	3983.1***	3939.9***	4016.8***
Hansen *J*	2.02	1.06	31.31	37.47	32.57	37.33	14.78	34.87	30.27	35.46	26.08	30.98	25.77	30.45	29.87
*Tl*1			-11.77***	-11.75***	-11.76***	-11.65***	-11.95***	-12.06***	-12.08***	-12.10***	-6.51***	-6.40***	-6.52***	-6.43***	-6.45***
*Tl*2			0.64	0.42	0.51	0.38	0.94	0.55	0.71	0.53	-0.67	-0.68	-0.67	-0.68	-0.68
No of instruments			51	60	56	61	51	60	56	61	42	49	46	50	51

This table reports the regression (2SLS-IV) results of the mediation effect of board turnover and board education on the relationship between cooperative banks and bank risk taking. Bank size denotes the natural logarithm of total assets. Bank age denotes the natural logarithm of the age of a bank. Business model is the ratio of loans to total assets as a proxy for the bank business model. Bank growth rate is the growth rate of assets. Listed bank is a dummy variable equal to 1 if a bank is listed in a stock exchange market. M&A is a dummy variable equal to 1 if a bank acquires another bank in a given year. Performance is expressed as the natural logarithm of bank profitability (ROE). Abnormal NPL is a dummy variable equal to 1 if the NPL/Gross Loans ratio of a bank is higher or lower than the 90th or 10th percentile, respectively. Regional GDP growth is gross domestic product growth rate at region level (20). Board size is the natural logarithm of the number of board members. Gender diversity denotes the percentage of female members on the board. Executive Committee is a dummy variable equal to 1 if an executive committee exists in a given bank. Popular bank is a dummy equal to 1 if a bank is a popular bank and 0 otherwise. Cooperative dummy is equal to 1 if a bank is a cooperative and 0 otherwise. Board turnover is the natural logarithm of board member turnover. Board education is the percentage of directors holding a university degree. Year and location dummies control for year and location fixed effects. Z values are reported in parentheses. Standard errors are robust to heteroskedasticity and autocorrelation. †, *, **, *** denote significance at the 10%, 5%, 1% and 0.1% levels, respectively.

Figure 1
Conceptual model

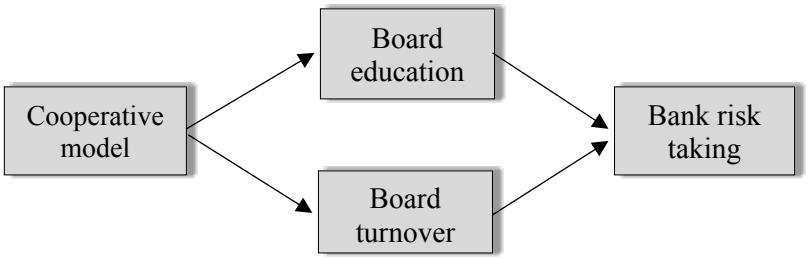

FIGURE 2
Interaction effects of bank size on the relationship between bank institutional setting and credit risk