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Management Board Composition of Banking Institutions and Bank Risk-Taking: The Case of the Czech Republic

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Abstract:
The paper investigates how management board composition of banking institutions impacts their risk-taking behavior in the Czech Republic. More specifically, we examine the effect of average director age, proportion of female directors, non-national directors and proportion of their attained education on four different bank risk proxies. We build a unique data set comprising selected biographical information on management board members of the Czech financial institutions holding a banking license over 2001-2012 period. For the Czech banking sector overall, we find that higher proportions of non-national directors increase bank risk measured by profit volatility and decrease bank stability captured by Z-score. Similarly, a larger proportion of directors holding an MBA raises bank riskiness measured by profit volatility. On the other hand, the presence of directors holding a PhD on boards of large Czech banks enhances bank stability captured by Z-score. Moreover, we detect risk-enhancing implications of board size for the segments of building savings societies and small and midsized banks. As for average board tenure, its effect on risk-taking varies depending on bank characteristics. We find mixed evidence on the effect of female directors and do not find any strong effect of directors' age on risk in the Czech banking sector.

Keywords: Management board composition, banks, risk-taking, panel data
JEL: C33, G21, G34, J16

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1 Introduction

The recent global crisis placed financial stability as well as financial supervision research in spotlight. In 2009 OECD Steering Group on Corporate Governance (Kirkpatrick, 2009) highlighted the need to pay special attention to commercial banks' corporate governance issues. They concluded that "the financial crisis can be to an important extent attributed to failures and weaknesses in corporate governance arrangements. When they were put to a test, corporate governance routines did not serve their purpose to safeguard against excessive risk-taking in a number of financial services companies". This aspect of financial supervision was additionally supported by The Basel Committee on Banking Supervision (BCBS) which has called attention to the need to study, understand, and improve the corporate governance of financial entities. The BCBS especially advocates studies of a governance structure composed of a board of directors and senior management (Basel Committee on Banking Supervision, 2006).

In the Czech Republic, Act on Banks 21/1992 governs the organizational structure of financial entities holding a banking license. This legislation requires that banks should implement such policies that would ensure diversity in the members of the governing bodies, e.g. in their profiles and backgrounds, views and sets of competencies. As a result, this diversity can lead to a wider pool of resources and expertise, generating more discussion, more monitoring and more challenges in the boardroom as stated in the European Commission's 2011 Green Paper (European Commission, 2011). In particular, the European Commission seeks to improve existing corporate governance practices, i.e. functioning, composition and skills of commercial banks' board of directors (European Commission, 2010).

Following these endeavors, this paper focuses on investigating how commercial banks' management board composition impacts bank risk-taking behavior in the Czech Republic over the 2001-2012 period. Namely, the paper aims to examine what effect commercial bank management boards have on bank risk-taking in terms of board size, average age of directors, director tenure, share of female directors, share of directors' attained education and share of non-national directors. To the author's best knowledge this is the first study of the economic effects of bank management board composition conducted to this extent for a post-transition CEE country with almost exclusive foreign ownership of its banking sector after the conclusion of the privatization process. Furthermore, the paper allows for investigating if managing directors holding different degrees affect bank risk in a dissimilar way. This differentiation between degree types diverges from similar studies that focus solely on economic effects of directors with MBA degree, e.g. Bertrand & Schoar (2003), or only directors with PhD, e.g. Berger *et al.* (2014), or those studies that do not differentiate between the two, e.g. Dionne & Triki (2005).

Overall, corporate governance research has produced numerous studies dedicated to roles and composition of board of directors. In these studies the center of interest is placed on board independence in terms of inside and outside directors (Hermalin & Weisbach, 1988); (Raheja, 2005); (Linck *et al.*, 2008), how this composition affects CEO turnover (Weisbach, 1988), the board size determinants (Boone *et al.*, 2007) or the conditions under which boards

are controlled by insiders as opposed to outsiders (Harris & Raviv, 2008). Furthermore, the link between ownership structure and board composition (Denis & Sarin, 1999), and effects of outside directors on performance (Dahya & McConnell, 2007); (Coles *et al.*, 2008); (Nguyen & Nielsen, 2010) have also been subject to investigation. Another block of studies relates board diversity in terms of gender to firm performance (Adams & Ferreira, 2009); (Ahern *et al.*, 2012); (Adams & Funk, 2012).

In the corporate governance literature, commercial bank boards' composition and its risk-taking implications are not sufficiently explored. The only other studies, to the author's knowledge, addressing this issue are conducted by Berger *et al.* (2014) with focus on Germany, by Pathan (2009) and by Erkens *et al.* (2012). However, two of these studies, Pathan (2009) and Erkens *et al.* (2012), use market-based proxies for bank risk-taking which are not applicable for many transition countries of the CEE region whose banks are not commonly listed on stock exchanges. Moreover, most studies focus on advanced countries, while relatively little is known about the corporate governance structure and its role in the banking sector of emerging economies. So far, relatively few studies (Adams & Mehran, 2008); (Caprio *et al.*, 2007); (Levine, 2004) focus on corporate governance issues in banks even though core aspects of corporate governance can be applied to them. Problems arising from different types of ownership and control as well as collective action issues that stakeholders face in search of efficient allocation of resources are all present also in financial firms. As banks are responsible for safeguarding depositors' rights, guaranteeing the stability of the payment system, and reducing systemic risk (Andres & Vallelado, 2008), they are subject to more intense regulation than other firms. Corporate governance research focused on banks in developing and transition countries is thus of high relevance. In addition, to the author's best knowledge the issue of bank management board composition and its impact on risk-taking has not yet been investigated to this extent for the a post-transition country in the CEE region and as such this paper aims to fill this gap in the literature.

Focusing on the Czech banking institutions, the analysis is performed for bank management boards in a system of corporate governance with two-tier boards. In two-tier systems, the management board, chaired by the CEO, runs the corporation and reports to the supervisory board. The supervisory board, on the other hand, holds the monitoring role equivalent to the role of non-managing directors in the one-tier system found in Anglo-Saxon countries. The supervisory board thus appoints and dismisses members of the management board on behalf of shareholders. Members of the supervisory board cannot simultaneously hold positions on the board of directors and vice versa. The two-tier system thus allows clear separation between inside directors who run the bank and hold their positions on the board of directors and outside directors, i.e. members of the supervisory board. This board design has risk-taking implications according to the literature. (Adams & Ferreira, 2007) found that increasing board independence in one-tier system makes CEO less likely to disclose information to non-managing directors to hinder their involvement in management decisions. This in turn results in less well informed top management decisions and has direct consequences for risk-taking. However, in two-tier

systems CEO does not face this trade-off in disclosing information and due to shareholders' interests being aligned with those of supervisory board, the monitoring of managing directors is more intensive and leads to less risk-taking (Berger *et al.*, 2014).

The paper aims to reveal a more efficient management board composition in terms of risk-taking in the Czech banking sector that also translates into implications for the Czech financial sector stability. In addition to investigating the impact of management board composition on risk-taking, the effect of some bank characteristics, i.e. bank size, capitalization or profitability, on bank risk appetite is observed.

The paper is structured as follows. Section 2 presents development and specificity of the Czech banking sector and formulates our research hypotheses. Section 3 builds the data set for investigating the research question and presents descriptive statistics in terms of board composition variables and bank financial indicators. Section 4 describes the applied methodology, Section 5 presents our findings, while Section 6 concludes.

2 Czech Banking Sector and Research Hypotheses

The current commercial banking sector emerged in the Visegrad Four countries, i.e. Hungary, Poland, Czech Republic and Slovakia, following the breakup of the state bank (monobank) system combined with issuing licenses to new banks. At the start of the transformation process, a two-tier banking system had to be created, with the central bank ensuring macroeconomic stability and in the Czech case also supervision of commercial banks, and commercial banks contributing to efficient credit allocation. The Czech Republic along with other post-communist countries faced similar problems that made transformation process difficult: (i) no managerial and supervisory know-how; (ii) no market history of potential lenders; (iii) greater uncertainty regarding the outcome of entrepreneurial projects; (iv) inherited bad loans; and (v) no adequate legal framework and regulation (Tuma, 2002).

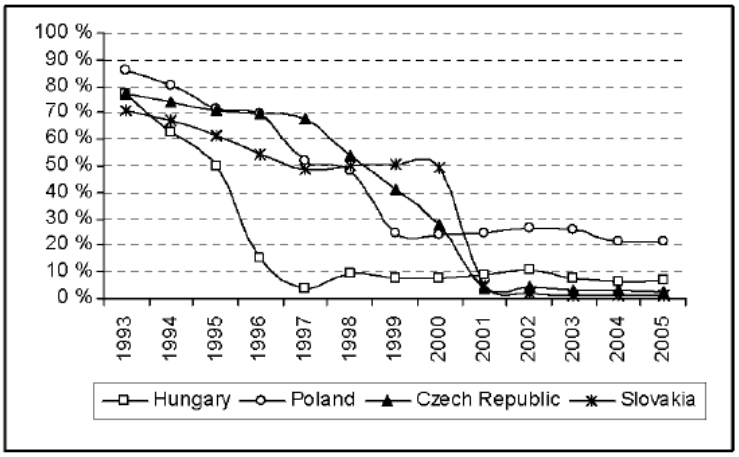
After the two-tier banking system was formed in 1990, the large Czech banks were transformed into joint-stock companies in 1992 and partially privatized. Nevertheless, the state kept controlling stakes in these banks until late 1990s. Banking licenses were granted quite freely to newly created banks in the early 1990s and the market was opened to foreign bank branches. This led to a fast increase in the number of banks during this time period.

During the period of economic boom of 1994-1996 triggered by inflows of foreign short-term capital and a subsequent growth of money supply, serious problems started to emerge in the sector of small banks from bad loans problem and other balance-sheet weaknesses. The economic recession in 1997-1998 worsened the excessive credit risk that the Czech banks had taken on owing to their poor corporate governance (Tuma, 2002). At the end of 1999, non-performing loans constituted more than 40% of the loans granted by the large banks, while the same indicator for small Czech-owned banks even exceeded 50%.

During the later stages of the transformation process in the second half of 1990s the share of foreign owners in the equity capital of the Czech banks grew sharply. The new shareholders of

the Czech banks are foreign banks based mostly in Belgium, France and Austria. The state is currently involved in only two banks specializing in government programs in the areas of export promotion and support for small businesses. The overall development of bank privatization in the Czech Republic and other Visegrad Four countries is summarized in Figure 1. Figure 1 shows the proportion of state control in the banks measured as the asset share of the banks owned by the state. The Czech Republic managed to achieve full banking privatization by 2001, as observed by Kocenda *et al.* (2007).

Figure 1: Proportion of State Control in the Visegrad Four Countries



Notes: Figure 1 shows the development of the proportion of state control in the banks in Visegrad Four countries measured as the asset share of the banks owned by the state. Source: Kocenda *et al.* (2007)

As a result of banking sector transformation and consolidation process there are currently 23 institutions that are holders of a banking license awarded by the Czech National Bank in the Czech Republic. Moreover, almost 97% of the Czech banking sector's balance sheet assets are controlled by foreigners according to Financial Stability Report 2011/2012 by CNB Financial Stability Department (2012).

Next, for our analysis we rely on the precondition that bank top management team's composition affects corporate decision-making and in turn corporate outcomes, as supported by e.g. Graham *et al.* (2013) and Adams & Ferreira (2009). This allows for the empirical examination of the research question in this paper. Furthermore, the project focuses on the following aspects to assess the effect of management board composition on bank risk-taking behavior:

1. Average Age of Directors

Empirical evidence suggests a negative relationship between age and risk-taking as given by Campbell (2006) for investment behavior, Bucciol & Miniaci (2011) for households risk attitudes or by Sahm (2007) and Grable *et al.* (2009) based on survey evidence. Therefore, we expect the coefficient with a negative sign for average board age in our analysis.

2. Proportion of Female Directors

There are two contrasting outlooks on how women affect economic outcomes. First, women are more risk averse than men in financial decision-making. This finding is supported by Jianakoplos & Bernasek (1998), Sunden & Surette (1998), and Agnew *et al.* (2003). Furthermore, women being less overconfident than men makes them less prone to making poor investment decisions as shown by Barber & Odean (2001), Niederle & Vesterlund (2007) and Goel & Thakor (2008).

Second, in corporate governance literature female directors are, however, more likely to take risks than men (Adams & Funk, 2012). A number of studies show that female directors execute excessive monitoring that decreases shareholder value (Almazan & Suarez, 2003); (Adams & Ferreira, 2007) and make poorer investment decisions as they face greater obstacles than men in gathering information (Bharath *et al.*, 2009). Owing to the dual effect of women on risk-taking in the literature, both effects of female director representation in management boards - increasing risk-taking as well as decreasing it - should be investigated.

The effect of female representation in boards on economic outcomes is currently of particular interest due to adoption of legislative measures regulating female board representation in some European countries, e.g. Norway, France, the Netherlands and Belgium.

3. Proportion of Attained Education

There is a dual effect of directors' educational background on corporate risk behavior. First, the survey by Graham & Harvey (2001) shows that directors holding an MBA degree employ sophisticated valuation techniques more than directors without such a degree. As a result, sophisticated valuation methods should reduce risk for a firm.

Second, directors with MBA are also shown to be more aggressive and employ riskier firm policies (Bertrand & Schoar, 2003). Following Berger *et al.* (2014), who found a risk-reducing effect of directors with a PhD, we also focus in our analysis on the effect of directors holding a PhD on bank risk. As there are no directors holding both a PhD and an MBA degree in our sample, this allows us to check if managing directors holding different degrees affect bank riskiness differently. Overall, both risk-reducing and risk-enhancing effect of education on corporate risk-taking should be examined.

4. Proportion of Non-national Directors

Literature typically finds a positive effect of foreign directors on firm performance as foreign directors might bring new technology and modern managerial techniques into the firm e.g. (Oxelheim & Randoy, 2003). On the other hand, Masulis *et al.* (2012) find that foreign independent directors can provide valuable international expertise and advice to firms but could weaken the board's monitoring and disciplining role. The European Commission's 2010 Green paper (European Commission, 2010) shares this outlook as it finds that "some interviewed companies highlighted the importance of foreign board members for international companies while others underlined the difficulties deriving from different cultural backgrounds and languages." Therefore, we hypothesize that foreign directors can either reduce bank riskiness via modern managerial techniques and better skills they bring into the bank or enhance bank risk due to

their unfamiliarity with the local market/banking sector specificity and obstacles in overcoming cultural and language barriers in the boardroom.

5. Board Size

There is a dual outlook on the number of directors on management boards, i.e. board size, in corporate governance literature. On one hand, larger boards potentially bring more experience and knowledge and offer better advice (Dalton *et al.*, 1999) as well as assign more people for supervision. On the other hand, boards with too many directors face considerable problems of coordination, communication, and decision-making (Lipton & Lorsch, 1992); (Jensen, 1993). A greater difficulty to achieve compromise in large decision-making groups results in bigger boards adopting less extreme decisions, e.g. (Nakano & Nguyen, 2012). This leads to the hypothesis that larger boards are associated with lower corporate risk-taking.

6. Director Tenure

There is a dual outlook on the impact of director tenure on firm performance, and by extension on firm risk as one of firm performance attributes, in the literature. (Huang, 2013) finds that board tenure can be positively or negatively related to firm value depending on firm characteristics. In more complex firms with greater advising needs board members are more likely to require more time to gain sufficient knowledge to perform appropriate strategic decision-making. Consequently, the quality of board advise and expertise increases in time with positive implications for firm performance. However, as the effect of board tenure is determined by the trade-off between marginal benefits of learning and marginal costs of entrenchment (Huang, 2013) also finds that marginal costs of entrenchment might quickly dominate over benefits of learning in firms with greater monitoring needs. This implies decreasing firm value in board tenure. Therefore, we hypothesize that the effect of board tenure can be either risk-enhancing or risk-reducing depending on bank characteristics.

3 Data Set and Descriptive Statistics

To investigate the effect of management board composition on risk-taking, we need to combine two types of data sets. The first data set is prepared by the author from annual reports of the 21 Czech institutions holding a banking license awarded by the Czech National Bank[1]. This data set is unique and includes selected information on banks' management board members. In particular, we collect data on average age of directors on board, the size of the management board, average length of time directors hold their positions on board, proportion of female directors, proportion of directors holding a PhD or an MBA and proportion of non-national directors[2]. The management board descriptive statistics and their development are presented in subsection 3.3.

[1]The remaining 2 banks that are also holders of the banking license are excluded from the analysis as they primarily serve government schemes in areas of export boost and assistance to small businesses as opposed to other commercial banks. Moreover, they are state-controlled and as such management board decisions in these banks might be motivated by other factors than in their privately-owned counterparts.

[2]Despite the evidence on the importance of financial expertise of directors on bank risk-taking by Minton *et al.* (2014), our analysis does not consider this director characteristic due to data limitations.

The second data set compiles financial data of individual banks extracted primarily from Bankscope database. As described in Section 2, the 1990s represented turbulent times for the Czech Republic, characterized by banking privatization and consolidation of the banking sector. Moreover, full banking privatization was achieved by 2001 (Kocenda *et al.*, 2007) and the Czech banking sector gained its current defining characteristics, e.g. in terms of being almost exclusively owned by foreign investors (Tuma, 2002); (CNB Financial Stability Department, 2012). For the reasons above and to control for potential bank survivor bias the combined data set covers the period of 2001-2012. The descriptive statistics of banks' financial variables are presented in subsection 3.3.

3.1 Bank Risk Measures

In this subsection we discuss various approaches to quantifying bank risk and classify them into three broad types of risk measures.

1. Market-based indicators of bank risk

Some studies investigate the impact of bank board composition on risk-taking using market-based measures of risk (Pathan, 2009);(Erkens *et al.*, 2012). Pathan (2009) for instance derive measures of bank total risk, systematic risk and idiosyncratic risk by using among other indicators bank equity returns. The advantage of these measures is that they reflect the market's perceptions about the risks inherent in the bank's assets, liabilities, and off-balance-sheet positions. However, these measures can not be used to capture riskiness of Czech banks owing to the fact that in the Czech Republic, similar to other post-transition countries of the CEE region, banks are not commonly listed on stock exchanges, thus their shares are not publicly traded.

2. Conventional indicators of bank risk

Z-score has been frequently used to analyze the determinants of bank risk-taking in the pre-crisis period, e.g. Laeven & Levine (2009), Foos *et al.* (2010), Altunbas *et al.* (2012) and Demirguc-Kunt & Huizinga (2010). Moreover, the measure has been widely used to capture bank stability in studies investigating relationship between bank competition and financial stability, for instance Agoraki *et al.* (2011), Anginer *et al.* (2014), Berger *et al.* (2009), Nicolo & Loukoianova (2007), Cihak & Hesse (2010), to mention the most prominent ones. Z-score indicates how many standard deviations in return on assets a bank is away from insolvency and by extension from the likelihood of failure:

$$Z\text{-}score_{i,t} = \frac{ROA_{i,t} + E_{i,t}/TA_{i,t}}{sROA_{i,t}}. \tag{1}$$

where i takes values from bank 1 to bank 21 and t indicates a year from 2001 to 2012. $ROA_{i,t}$ captures return on assets of bank i at time t, $E_{i,t}/TA_{i,t}$ measures share of a bank's equity capital over bank total assets and $sROA_{i,t}$ measures volatility of bank's return on assets calculated as a 3 year moving average.

Another popular risk proxy is the ratio of non-performing loans over total bank loans (NPL

ratio). This is a credit quality measure with respect to the banks' lending practices. Similarly to Z-score, NPL ratio is abundantly used as a fragility indicator in bank competition-stability literature, e.g. Cihak & Schaeck (2012), Agoraki *et al.* (2011), Yeyati & Micco (2007) or Berger *et al.* (2009). Nevertheless, the NPL ratio only covers credit risk and cannot be directly linked to the likelihood of bank failure (Beck, 2008).

Next, volatility of return on assets (sROA), calculated as a 3 year moving average is also used as a proxy for bank risk. This measure of individual bank distress focuses on bank profitability, in particular on volatility of bank profits and is frequently used in the literature along with other indicators of bank risk, i.e. Z-score, NPL ratio (Beck *et al.*, 2013); (Cihak & Schaeck, 2012); (Uhde & Heimeshoff, 2009) or (Liu *et al.*, 2012).

As the last proxy for bank risk we focus on bank liquidity risk. Several indicators can be used to capture bank liquidity, for example the ratio of quick assets to total assets, ratio of time deposits to total deposits, ratio of quick assets to client deposits or the ratio of client deposits to total client loans. In addition to liquidity stress tests, the developments of these measures of liquidity are tracked for the purposes of analyzing the Czech banking sector liquidity position by CNB Financial Stability Department (2015). In our analysis, we use the ratio of liquid assets over customers' deposits and short-term funding (LAsfund). This measure allows to understand whether the buffer of liquid assets held by a bank will be sufficient to meet its short-term liabilities. Bonfim & Kim (2012) advocate the use of this indicator due to its closeness to the international regulatory framework on liquidity risk, which is a part of the Basel III regulatory package. In particular, the liquidity coverage ratio (LCR) proposed in Basel III captures the short-term resilience of the liquidity risk profile of a bank, i.e. it captures the stock of liquid assets that can be easily and immediately converted into cash to meet a bank's liquidity needs.

Despite the ease of use of these bank risk proxies, their simplicity and popularity in the literature, they are derived from banks' financial reports, and as such are inherently backward-looking.

3. Efficiency-based indicators of bank risk

Podpiera & Weill (2009) derive a new measure of excessive bank risk-taking based on the application of Markowitz portfolio approach to Czech banks. First, they compute the risk and return for each category of loans at the country level (i.e. aggregated across all banks), followed by application of the portfolio approach to estimate the efficient frontier, i.e. the combinations of shares of loan categories that produce the least risk for a given return. To obtain a measure of excessive risk-taking for the Czech banking sector in each time period, they compare the actual outcome to the efficient frontier. Regarding the definition of risk, Podpiera & Weill (2009) assume that the interest rate charged on loans includes ex ante risk compensation, i.e. based on clients' overall creditworthiness. This, however, does not distinguish whether the riskiness comes from differences in maturity or differences in creditworthiness for different loan categories in a bank's portfolio. In contrast to some conventional measures of risk, i.e. NPL ratio, that

measure the ex post realized risk, the measure by Podpiera & Weill (2009) is oriented towards ex ante risk assessment.

Moreover, this measure reflects changes in the exposure structure rather than business cycle fluctuations. Thus authors suggest that it could serve as a complementary indicator to the conventional NPL ratio, which reflects the business cycle only.

However, a significant reallocation might violate an assumption of the portfolio approach used to construct this measure, i.e. an exogenous relationship between the shares of loans in each category and the return and risk characteristics of each category of loans. Furthermore, Podpiera & Weill (2009) are restricted in the construction of their measure to the period from January 2005 to February 2008 due to data availability issues. Therefore, this hinders applicability of this measure in earlier years in our analysis and would ultimately lead to further shortening of our data set.

In another study, Podpiera & Weill (2007) attempt to identify whether either a conventional NPL ratio or bank cost efficiency is the key determinant of bank failures. They provide clear support for the bad management hypothesis according to which deterioration in cost efficiency precede increases in non-performing loans, and reject the bad luck hypothesis, which predicts the reverse causality.

To conclude the discussion of potential risk indicators, market-based measures can not be used to address our research question as Czech banks' shares are not traded on stock market. Efficiency-based indicators, despite their usefulness, are subject to data issues and would thus hinder our analysis in years preceding 2005. Consequently, for analyzing how management board composition affects bank risk-taking we use the four conventional indicators of bank risk, i.e. Z-score, NPL ratio, profit volatility and the ratio of liquid assets over customers' deposits and short-term funding. In addition, the use of these indicators would make our results consistent and comparable to most studies dealing with board composition issues as performance indicators extracted from financial reports are abundantly used in the literature.

3.2 Bank Control Variables

To estimate the effect of management board composition on bank risk, we also need to control for individual bank characteristics in our analysis, by including the following variables:

First, ***bank size***, expressed as ratio of a bank's total assets to the Czech banking sector's total assets, accounts for the fact that larger banks have a greater capacity to absorb risk and that some banks are too big to fail. Therefore, a positive relation is expected between bank size and risk-taking.

Second, ***logarithm of total assets*** is added to account for asset growth in first differences. In times of fast asset growth banks are characterized by a different amount of risk-taking.

Third, according to Keeley (1990) incentives to take risks are reduced if a bank has a large charter value. ***Charter value*** can be defined as future economic rents a bank can obtain from its access to markets that are to a large extent protected from competition. Hutchison &

Pennacchi (1996) show that a ratio of demand deposits to total deposits is a good proxy for a bank's charter value. A negative relation between risk-taking and charter value is expected.

Fourth, a ***share of Tier 1 capital on total capital***, calculated as Tier I capital to Tier I and Tier II capital, is also included as capital increases monitoring and decreases moral hazard incentives (Morrison & White, 2004), (Allen *et al.*, 2011). Thus, a negative relation is anticipated between Tier I capital share and risk-taking.

Fifth, a ***merger dummy***, that takes a value one if bank engaged in a merger or zero otherwise, should be included as mergers often coincide with board composition changes.

Sixth, to incorporate macroeconomic conditions ***year dummies*** are included. They account for common shocks in market and regulatory environment.

Last, ***parent bank's risk appetite*** needs to be accounted for in the analysis as almost 97% of the Czech banking sector's balance sheet assets are controlled by foreigners (CNB Financial Stability Department, 2012). This control assumes there exists a link between the riskiness of a foreign parent bank and their Czech affiliate. It is measured in the same way as domestic bank risk-taking to keep the analysis consistent.

The final data set is of annual frequency. Table 1 provides overview of the data and lists sources for individual variables.

Table 1: Overview of variables in the data set

Variable	Expected sign	Description	Source
Risk measures			
NPLL		Share of non-performing loans over total loans	Bankscope
LAsfund		Ratio of liquid assets over deposits and short-term funding	Bankscope
Z		Z-score (profitability and capitalization over volatility of profits, calculated over the period of 3 years)	Bankscope
sROA		3-year ROA volatility	Bankscope
Board variables			
Boardsize	+/-	Number of directors on management board	Annual reports
Avrage	-	Average age of directors	Annual reports
Avrboardten		Average number of years over which directors hold their positions on board	Annual reports
Sharefem	+/-	Proportion of female directors on board	Annual reports
SharePhD	-	Proportion of directors with PhD on board	Annual reports
ShareMBA	+/-	Proportion of directors with MBA on board	Annual reports
Shareforeign	+/-	Proportion of foreign directors on board	Annual reports
Control variables			
TAg	+	Growth rate of total bank assets	Bankscope
Banksize	+	Share of bank's total assets on bank sector's total assets	Bankscope
Charterval	-	Bank's demand deposits over total deposits used as a proxy for charter value	Bankscope
Tier1	-	Share of Tier I capital on bank's capital	ICD
MergerDummy		equals 1 if a bank engaged in merger in a given year	Annual reports
Dbank		equals 1 if the institution is a general commercial bank	

Continued on next page

Table 1: Overview of variables in the data set (continued)

Variable	Expected sign	Description	Source
DS		equals 1 if the institution is a building saving society	
Dlar		equals 1 if Banksize exceeds 75th percentile	
Dbetter		equals 1 if Tier 1 is above median value	
Dadeq		equals 1 if Tier 1 is below median value	
Parent bank risk measures			
mNPLL		Parent bank's share of non-performing loans over total loans	Bankscope
mLAsfund		Parent bank's ratio of liquid assets over deposits and short-term funding	Bankscope
mZ		Parent bank's Z-score (profitability and capitalization over volatility of profits, calculated over the period of 3 years)	Bankscope
msROA		Parent bank's 3-year ROA volatility	Bankscope

Notes: Expected signs should be reversed for Z-score and ratio of liquid assets over deposits and short-term funding as these are proxies for bank stability as opposed to bank riskiness. Equation 1 provides definition of Z-score. ICD = internal Czech National Bank's regulatory information database.

3.3 Descriptive Analysis of the Czech Banking Sector

Now, we turn to descriptive analysis of the data set that was introduced in the first part of Section 3. We divide all Czech banks in the sample into categories by their business model, size and capitalization and provide their descriptive statistics.

By **business model**, Czech banks can be divided into general commercial banks and building savings societies, a specialized type of banks that concentrate on raising savings of their clients for home construction purposes, provide loans for new home construction or renovation and whose product receives state support. Currently, there are 5 building saving societies in the Czech Republic and 16 general commercial banks that we include in the sample. State is involved in the remaining 2 banks that serve a specific government scheme, thus are excluded from our analysis.

As to the **size** of Czech banks, we divide them into large banks when the share of their total assets on the Czech banking sector's total assets exceeds 75th percentile of the distribution. Otherwise, we classify the bank as a small or midsized bank. This condition essentially divides banks into top five largest banks in the Czech Republic and the remaining 16 banking institutions.

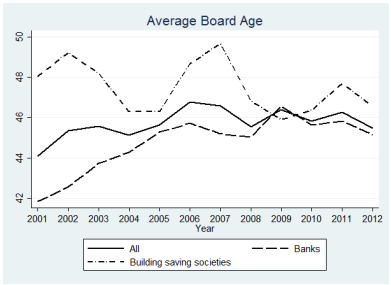
As for **capitalization**, we put banking institutions whose Tier I ratio exceeds the mean of the distribution into the category of banks that are better than sufficiently capitalized. On the other hand, banks with Tier I ratio below mean belong into the category of sufficiently capitalized banks. According to CNB Financial Stability Department (2012) the Czech banking sector maintains quite high overall capital adequacy and Tier 1 capital adequacy ratios with only a small proportion of individual banks, representing 5.1% of the sector's total assets, that do not exceed prescribed capitalization levels.

Figure 2 shows the development of management board characteristics over 2001-2012 for

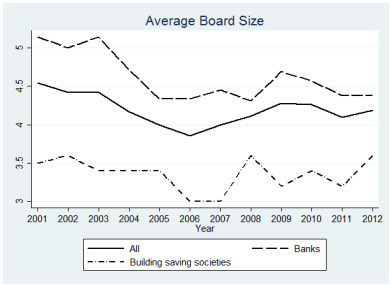
all Czech banks in the sample as well as for general commercial banks and building savings societies.

Figure 2: Development of Management Board Characteristics

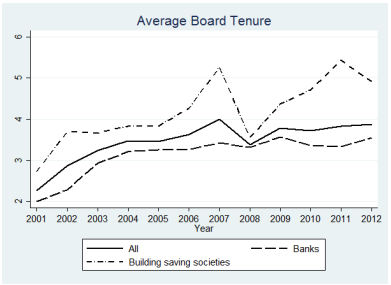
(a) Average Director Age



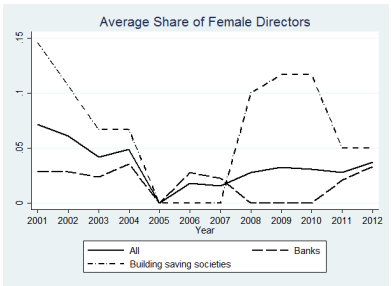
(b) Average Board Size



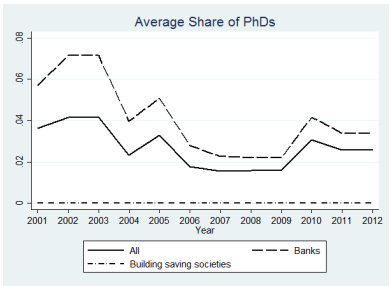
(c) Average Director Tenure



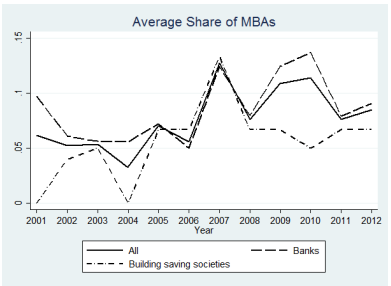
(d) Proportion of Female Directors



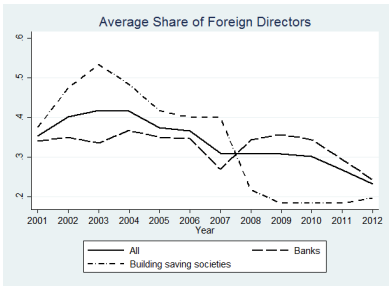
(e) Proportion of PhDs



(f) Proportion of MBAs



(g) Proportion of Foreign Directors



Notes: The solid line represents development of management board characteristics for all Czech banking institutions in the sample. The dashed line represents general commercial banks while dash-dot line represents Czech building savings societies. Source: Author's calculations

From Figure 2 we observe that average director age and tenure increased over 2001-2012 while average board size decreased over the same period. However, for the Czech building savings societies board size does not appear to change much on average from the beginning of the sample. Overall, the proportion of women on management boards fell from the beginning of the sample with the exception of general commercial banks for which this proportion fluctuates in time. As for the attained education of directors, proportion of directors holding a PhD on management boards of all banking institutions and general commercial banks decreased from sample beginning whereas there have been no directors with a PhD on boards of building savings societies since 2001 at all. On the other hand, the proportion of directors with MBA

rose in time for the entire sector and for building savings societies. In general commercial banks the proportion of directors holding MBA degree appears to be similar at sample end to the proportion in 2001. The proportion of non-national directors in general commercial banks seems to have decreased over time while it has fallen more dramatically on building saving societies' management boards over 2001-2012. Table 2 presents overview of management board characteristics for individual categories of banking institutions.

Table 2: Management Board Characteristics by Bank Category

Variable	*No. of obs*	*Mean*	*Std. Dev.*	*Min*	*Max*	*No. of obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
	General commercial banks					**Building savings societies**				
Avrage	129	45.03	5.32	35.75	62.67	59	47.47	4.59	37.00	57.67
Avrboardten	129	3.23	2.28	0.00	9.60	59	4.21	2.07	0.33	8.33
Boardsize	129	4.56	1.60	2.00	9.00	59	3.36	0.55	3.00	5.00
Sharefem	129	0.02	0.06	0.00	0.33	59	0.07	0.12	0.00	0.33
SharePhD	129	0.04	0.10	0.00	0.40	59	0.00	0.00	0.00	0.00
ShareMBA	129	0.09	0.13	0.00	0.67	59	0.06	0.12	0.00	0.33
Shareforeign	129	0.32	0.28	0.00	1.00	59	0.34	0.22	0.00	0.67
	Large banks					**Small and Midsized banks**				
Avrage	47	48.71	3.48	40.29	54.25	141	44.82	5.34	35.75	62.67
Avrboardten	47	4.59	2.75	0.00	9.60	141	3.18	1.96	0.00	8.33
Boardsize	47	6.13	1.24	4.00	9.00	141	3.53	0.82	2.00	7.00
Sharefem	47	0.00	0.00	0.00	0.00	141	0.04	0.10	0.00	0.33
SharePhD	47	0.08	0.12	0.00	0.40	141	0.01	0.05	0.00	0.33
ShareMBA	47	0.11	0.11	0.00	0.33	141	0.07	0.13	0.00	0.67
Shareforeign	47	0.35	0.18	0.00	0.67	141	0.32	0.28	0.00	1.00
	Better Capitalized Banks					**Sufficiently Capitalized Banks**				
Avrage	68	45.54	4.43	35.75	54.25	120	45.94	5.62	36.00	62.67
Avrboardten	68	3.69	2.31	0.00	9.60	120	3.45	2.23	0.00	9.60
Boardsize	68	4.04	1.24	3.00	9.00	120	4.26	1.59	2.00	9.00
Sharefem	68	0.03	0.09	0.00	0.33	120	0.03	0.09	0.00	0.33
SharePhD	68	0.02	0.07	0.00	0.40	120	0.03	0.09	0.00	0.33
ShareMBA	68	0.09	0.13	0.00	0.33	120	0.07	0.13	0.00	0.67
Shareforeign	68	0.27	0.28	0.00	1.00	120	0.36	0.25	0.00	1.00

Notes: The table presents descriptive statistics of board variables by bank category. The banking institutions with Tier I ratio greater than median constitute better than sufficiently capitalized banks while those institutions with Tier I ratio smaller than median form sufficiently capitalized bank group. The banks whose asset share on the Czech banking sector's assets exceeds 75th percentile constitute large banks. The banks with lower asset share are defined as small and midsized banks. The definitions of individual variables can be found in Table 1. Source: Author's calculations

By dividing banking institutions into general commercial banks and building savings societies, we can observe that directors on management boards in general commercial banks are younger by 2 years on average and hold their positions on board shorter by 1 year on average. Moreover, boards of general commercial banks are larger by more than 1 board member on average and have a greater share of directors with an MBA degree. In comparison, building saving societies' boards have a larger proportion of female and non-national directors while there were not any directors with a PhD in building savings societies over the sample period.

Table 2 shows that large banks have older directors by almost 4 years on average who hold their positions on board on average more than 1 year longer than managing directors in small and medium-sized banks. Large banks also have larger boards by almost 3 board members on

average and more directors holding a PhD or an MBA degree. Similarly, slightly more foreign directors sit on management boards in large banks while there were not any female directors on management boards in large banks.

In terms of capitalization, both categories of banks have directors of comparable age on their management boards. However, directors in better than sufficiently capitalized banks stay on boards slightly longer while sufficiently capitalized banks tend to have slightly larger boards. Both categories have the same proportion of women on board on average while sufficiently capitalized banks have more non-national directors on board. As for attained education, there are more directors holding MBA on boards of better capitalized banks whereas sufficiently capitalized banks tend to have more directors with a PhD on management boards.

Now, we turn to breakdown of financial variables in the sample by bank category.

Table 3: Financial Variables by Bank Category

Variable	*No. of obs*	*Mean*	*Std. Dev.*	*Min*	*Max*	*No. of obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
	General Commercial Banks					**Building savings societies**				
NPLL	108	0.06	0.05	0.00	0.25	25	0.02	0.01	0.01	0.04
LAsfund	124	41.20	39.03	0.62	367.18	49	15.21	11.83	0.06	47.44
logZ	125	3.99	1.09	1.51	7.44	44	3.75	0.95	2.32	7.45
sROA	125	0.39	0.46	0.01	2.92	44	0.16	0.11	0.00	0.44
TAg	112	0.16	0.26	-0.12	2.31	56	0.11	0.11	-0.01	0.57
Charterval	104	-0.01	0.14	-0.56	0.41	43	0.00	0.01	-0.01	0.03
Tier1	130	0.90	0.11	0.60	1.33	28	0.96	0.10	0.72	1.10
	Large Banks					**Small and Midsized Banks**				
NPLL	44	0.05	0.04	0.01	0.24	89	0.06	0.05	0.00	0.25
LAsfund	47	37.21	19.90	11.82	79.03	126	32.58	39.89	0.06	367.18
logZ	47	3.99	0.97	1.65	5.51	122	3.91	1.10	1.51	7.45
sROA	47	0.27	0.27	0.04	1.26	122	0.35	0.46	0.00	2.92
TAg	46	0.06	0.08	-0.12	0.44	122	0.18	0.25	-0.12	2.31
Charterval	46	-0.02	0.14	-0.56	0.19	101	0.00	0.11	-0.44	0.41
Tier1	45	0.89	0.10	0.70	1.01	113	0.92	0.12	0.60	1.33
	Better Capitalized Banks					**Sufficiently Capitalized Banks**				
NPLL	58	0.06	0.05	0.00	0.25	75	0.05	0.05	0.00	0.24
LAsfund	66	38.44	49.59	0.06	367.18	107	31.00	22.93	0.68	137.01
logZ	61	4.12	1.01	1.51	7.45	108	3.82	1.08	1.65	7.44
sROA	61	0.29	0.38	0.00	2.12	108	0.35	0.43	0.01	2.92
TAg	62	0.14	0.31	-0.05	2.31	106	0.15	0.15	-0.12	0.73
Charterval	59	-0.01	0.13	-0.56	0.36	88	-0.01	0.11	-0.44	0.41
Tier1	72	1.00	0.05	0.96	1.33	86	0.83	0.09	0.60	0.96

Notes: The table presents descriptive statistics of financial variables by bank category. The banking institutions with Tier I ratio greater than median constitute better than sufficiently capitalized banks while those institutions with Tier I ratio smaller than median form sufficiently capitalized bank group. The banks whose asset share on the Czech banking sector's assets exceeds 75th percentile constitute large banks. The banks with lower asset share are defined as small and midsized banks. The presented descriptive statistics in this table are for stationary variables. The definitions of individual variables can be found in Table 1. Source: Author's calculations

Table 3 shows that general commercial banks compared to building saving societies are slightly more stable overall as measured by Z-score and enjoy on average almost 3 times more liquidity at their disposal (CNB Financial Stability Department, 2012). However, lower liquidity levels in Czech building savings societies can be justified by their business model and type of

loans these institutions provide. On the other hand, general commercial banks have more than twice higher profit volatility and a greater share of non-performing loans in their loan portfolios compared to building savings societies. In contrast, building savings societies are slightly more capitalized. In terms of asset growth, general commercial banks dominate the segment of building savings societies which can be attributed to a drop in their share in house purchase loans, the growing segment of mortgage loans and migration of clients to competing mortgage banks when refinancing their house purchase loans (CNB Financial Stability Department, 2012).

Large banks have higher share of liquid assets on customers' deposits and short-term funding on average, indicating more liquidity at their disposal. Moreover, large banks have marginally higher Z-score compared to the segment of small and midsized banks. Small and midsized banks, on the other hand, have comparable ratio of non-performing loans and slightly higher volatility of their return on assets (sROA) that points to greater profit volatility. The segment of small and midsized banks is, by having higher Tier I ratio on average, slightly better capitalized. Over the sample period assets of small and midsized banks grow 3 times faster than those of large Czech banks.

As for better than sufficiently capitalized and sufficiently capitalized banks, most of the financial variables presented in Table 3 are comparable as to their magnitude for the two groups. However, better capitalized banks have more liquidity at their disposal as measured by the ratio of liquid assets to deposits and short-term funding.

4 Methodology

4.1 Discussion of Endogeneity and Estimation Approach

Endogeneity is a frequent problem in corporate governance analysis (Hermalin & Weisbach, 2003). In our case, not only does the board composition affect risk-taking but the reverse implication (risk-taking impacting management board composition) might be an issue. Wooldridge (2001) advises to apply a transformation that eliminates the unobserved effects and instruments that deal with endogeneity for models that violate strict exogeneity condition. Therefore, we use the two-step system estimator (SE) with standard errors adjusted for potential heteroskedasticity (Arellano & Bond, 1988) to estimate the model specified as follows:

$$\textit{Bank risk-taking}_{i,t} = \alpha + \sum_{j} [\beta_j * \textit{board variables}^{j}_{i,t}] + y * \textit{control variables}_{i,t} + \epsilon_{i,t}. \qquad (2)$$

where i takes values from bank 1 to bank 21 and t indicates a year from 2001 to 2012. The parameter β captures the impact of management board composition on risk-taking. The board variables in Equation 2 are the variables of interest whose effect on bank risk-taking we primarily study. The full list of board variables can be found in Table 1 in Section 3. In order to quantify the effect of board variables on risk-taking, we also control for the variables that

could potentially affect a bank's risk appetite. These variables are also listed in Table 1 under Control variables and Parent bank risk measures headers.

The method by Arellano & Bond (1988) requires transforming variables into first differences to account for the unobserved effect and using generalized method of moments estimation (GMM) to deal with endogeneity. Next, to allow estimation we need to build the instruments for variables that are potentially endogenous. The logic is that lagged board variables can be used as instruments owing to the fact that board variables in earlier years could not have resulted from bank risk-taking in subsequent years. Moreover, since the sample size for the Czech Republic is not large, we also apply a small sample-size adjustment by Windmeijer (2005). This adjustment should improve result robustness and prevent any potential downward bias in estimated asymptotic standard errors. We report the GMM estimation results for all the dependents in which we include all 7 board variables from Table 1 in Table B1.

Despite the fact that we use only one lag of each board variable as instruments and collapsing them, the GMM estimation of our model in Table B1 suffers from the problem of too many instruments. According to Roodman (2006) a finite sample may lack adequate information to estimate such a large matrix well. Our sample being quite small in both time dimension and cross-sectional dimension causes that the instrument collection in the GMM overfits endogenous variables. In addition, the problem of too many instruments weakens the Sargan/Hansen instrument validity test to the point where it generates implausibly good p values of 1.000 as is the case in Table B1.

Due to the small size of the sample we turn to instrumental variables regressions to test validity and exogeneity of instruments. We estimate the model in Equation 2 by means of two-stage least squares (2SLS) regressions, where exogeneity of director characteristics, i.e. the proportion of female directors, of directors holding a PhD, an MBA and of foreign directors was tested in separate regressions. Up to three lags of each director variable were used as instruments. The 2SLS results are reported in Appendix B.

J statistic of the Sargan-Hansen test of validity of used instruments and their correct exclusion from the estimated equation, and C statistic of exogeneity testing of director characteristics are reported in Table B2, Table B3 and Table B4 for regressions with different dependents. The null hypotheses of instrument validity and exogeneity of director variables can not be rejected on 5% significance level in all regression specifications apart from one. In instrumenting the effect of the proportion of directors with a PhD on bank risk measured NPL ratio, the null of instrument validity is not rejected. This might invalidate the effect of directors holding a PhD on bank risk as reported in Table B2.

Having confirmed absence of endogeneity of director characteristics, we can now estimate the model in Equation 2 by taking into account specific features of each bank in the sample (e.g. management style, business strategy), i.e. unobservable and constant heterogeneity. For this purpose we use panel structure of the data set to deal with the presence of unobservable fixed effects associated with each commercial bank and correlated with the rest of the explanatory

variables (Andres & Vallelado, 2008). The approach follows Liang *et al.* (2013) who estimate impact of bank board characteristics on bank performance in China.

5 Empirical Results

Based on the discussion and results of endogeneity testing in Section 4, we analyze the impact of board and bank characteristics on bank risk-taking by means of fixed effects panel regressions and estimate the model specified in Equation 2. In all regressions, we regress the risk-taking proxy on the set of board variables, i.e. board size, director age and director tenure. Next, we add additional director characteristics in separate regressions, i.e. proportion of female directors, proportion of directors with a PhD, proportion of directors holding MBA and proportion of non-national directors. As we run a large number of regressions in our analysis (i.e. 4 regressions with director characteristics added separately per each of the 4 risk-taking dependents in baseline analysis and the same number for each segment of the Czech banks), we report in subsection 5.1 and subsection 5.2 only those regressions in which either director or board characteristics emerged significant.

5.1 Baseline model

Table 4 presents calculations of the impact of board and bank financial variables on each of the bank risk proxies for all Czech banks in the sample.

For the Czech banking sector overall, *board size, director age and director tenure* do not affect bank riskiness measured by either of the four risk proxies. Table 4, however, shows that a larger *proportion of non-national* directors on board decreases bank stability captured by Z-score and increases bank profit volatility measured by ROA volatility. A higher proportion of directors holding MBA also increases bank risk measured by ROA volatility. This finding is in line with e.g. Bertrand & Schoar (2003) who show that directors with MBA are more aggressive and employ riskier firm policies. As for the risk-enhancing effect of foreign directors, this result is contrary to the effect commonly found in the literature that foreign directors improve firm performance (Oxelheim & Randoy, 2003). The finding, however, supports the hypothesis that foreign directors might face obstacles in overcoming cultural and language barriers in the boardroom and suffer from unfamiliarity with the local market specificities which in turn translate into increased bank risk (Masulis *et al.*, 2012); (European Commission, 2010).

Table 4: Impact of Board Characteristics on Bank Risk - Baseline Model

VARIABLES	**NPLL**	**logZ**	**sROA**	**sROA**	**LAsfund**
Avrage	-0.00142	-0.00178	0.00182	0.00481	-0.0538
	(0.00134)	(0.0346)	(0.00823)	(0.00633)	(0.582)
Boardsize	-0.00199	-0.136	0.0244	0.0373	-0.388
	(0.00280)	(0.0962)	(0.0148)	(0.0272)	(1.133)
AvrBoardten	0.00246	-0.000296	-0.0186	-0.0112	2.211

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Table 4: Impact of Board Characteristics on Bank Risk - Baseline Model (continued)

VARIABLES	**NPLL**	**logZ**	**sROA**	**sROA**	**LAsfund**
	(0.00215)	(0.122)	(0.0231)	(0.0266)	(1.762)
TAg	-0.121***	0.640	-0.363	-0.335	1.297
	(0.0272)	(0.664)	(0.284)	(0.208)	(12.57)
Banksize	0.344	-35.77**	9.268**	9.520***	113.1
	(0.215)	(16.12)	(3.264)	(2.797)	(336.7)
Charterval	0.0700***	-0.822	-0.0773	-0.0513	-1.957
	(0.0195)	(0.757)	(0.131)	(0.115)	(12.50)
MergerDummy	0.00398	0.0312	-0.0196	0.000872	10.00
	(0.00904)	(0.380)	(0.0680)	(0.0656)	(9.261)
Tier1	-0.0586***	2.754	-0.767**	-0.836**	1.081
	(0.0167)	(2.301)	(0.353)	(0.302)	(31.60)
Parent bank risk	0.137***	0.180*	0.0556	0.0538	0.437**
	(0.0189)	(0.0965)	(0.0349)	(0.0340)	(0.158)
Sharefem					
SharePhD					
ShareMBA			0.186*		
			(0.102)		
Shareforeign	-0.0201	-1.708**		0.623*	13.59
	(0.0322)	(0.667)		(0.354)	(13.06)
Constant	0.107***	0.134	1.025**	0.768	48.27**
	(0.0145)	(2.385)	(0.361)	(0.453)	(21.78)
Year dummies	YES	YES	YES	YES	YES
Observations	76	102	100	100	108
R-squared	0.746	0.340	0.379	0.432	0.430
No. of Institutions	16	18	18	18	20

Notes: Equation 2 is estimated by fixed effects with clustered standard errors at bank level (in parentheses). The first line of Table 4 shows dependents in individual regressions. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1.

As for bank financial variables from Table 4, large banks in terms of their asset share on the Czech banking sector's total assets tend to be more risky as captured by Z-score and ROA volatility. On the other hand, better capitalization decreases bank riskiness in terms of non-performing loan ratio and profit volatility. These findings are in line with expected signs for bank financial variables in Section 3[3].

Next, in subsection 5.2 we focus on investigating the effect of management board composition on bank risk for different categories of Czech banks.

5.2 Results for Different Bank Categories

For each of the categories of the Czech banks presented in Section 3 we investigate the effect of management board characteristics on bank risk-taking by adding dummy interactions for each bank category (i.e. the building savings society dummy, the large bank dummy and the sufficiently capitalized dummy) with individual board variables into baseline regressions

[3]The author initially included into the model specified in Equation 2 additional financial variables as controls, i.e. share of customer loans to total bank assets, ratio of bank off-balance sheet items on total bank assets and interest rate spread defined as the difference between bank lending rate and bank borrowing rate. These variables, however, are not jointly significant and were thus excluded from the analysis.

presented in Table 4. Again, to save space only those regressions are reported in which either board or director characteristics are significant.

Table 5 shows which board composition characteristics influence riskiness in general commercial banks and building savings societies. First, longer director tenure increases bank risk measured by ROA volatility and impairs stability captured by Z-score in building savings societies. This finding could be explained by the fact that boards with long tenure are likely to be too set in their ways and to suffer from entrenchment, e.g. Huang (2013).

Second, female directors appear to exacerbate riskiness measured by non-performing loans ratio in building savings societies while their impact on risk-taking is mixed and depends on the type of risk captured by the risk proxies in general commercial banks. This highlights the ambiguous or dual effect women on boards might have on risk-taking, e.g. (Barber & Odean, 2001), (Adams & Ferreira, 2007).

Third, a higher proportion of foreign directors on management boards of general commercial banks impairs stability and increases ROA volatility. The result is contrary to the effect commonly found in the literature that foreign directors improve firm performance, e.g. Oxelheim & Randoy (2003). Despite the fact that general commercial banks have on average larger boards than building savings societies (Table 2) with the advantage to ensure more dialogue and more compromises on the way to reach consensus Nakano & Nguyen (2012), they still seem not be able to mitigate the unfavorable implications of foreigners directors (i.e. due to foreign directors' lack of familiarity with the local market, language barriers, etc.) on risk.

Next, there is also evidence that larger board size increases riskiness of building savings societies when measured by non-performing loans ratio. This risk-enhancing effect of board size in the Czech building savings societies is in line with Eisenberg *et al.* (1998) who found a significant negative correlation between board size and profitability in a sample of small and midsized firms where Czech bulding savings societies belong.

Table 5: Impact of Board Characteristics on Bank Risk - By Business Model

VARIABLES	**NPLL**	**logZ**	**logZ**	**sROA**	**sROA**	**LAsfund**
Avrage	-0.00151	-0.0112	-0.0359	0.00510	0.0117	-0.0462
	(0.00146)	(0.0474)	(0.0394)	(0.0108)	(0.00867)	(0.707)
DS_Avrage	0.00117	0.109	0.155	-0.0148	-0.0194	1.136
	(0.00176)	(0.118)	(0.127)	(0.0212)	(0.0260)	(1.624)
Boardsize	-0.00276	-0.163	-0.191	0.0376**	0.0440	-0.494
	(0.00290)	(0.0938)	(0.121)	(0.0148)	(0.0311)	(1.396)
DS_Boardsize	0.0174**	0.495	0.389	0.0457	0.00126	11.80*
	(0.00627)	(0.693)	(0.582)	(0.137)	(0.109)	(6.291)
AvrBoardten	0.00194	0.133	0.174	-0.0384	-0.0496	4.212*
	(0.00260)	(0.117)	(0.107)	(0.0303)	(0.0295)	(2.371)
DS_AvrBoardten	0.00445	-0.268*	-0.282*	0.0738**	0.0892**	-2.611
	(0.00444)	(0.136)	(0.152)	(0.0346)	(0.0368)	(2.214)
TAg	-0.123***	0.653	0.630	-0.383	-0.333	0.0239
	(0.0281)	(0.962)	(0.824)	(0.317)	(0.238)	(13.87)
Banksize	0.366*	-38.26**	-38.94**	10.38***	9.821***	126.1
	(0.202)	(16.17)	(15.02)	(3.554)	(3.110)	(297.2)

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Table 5: Impact of Board Characteristics on Bank Risk - By Business Model (continued)

VARIABLES	**NPLL**	**logZ**	**logZ**	**sROA**	**sROA**	**LAsfund**
Charterval	0.0676***	-0.988	-1.008	-0.0265	0.0217	0.770
	(0.0213)	(0.887)	(0.877)	(0.151)	(0.131)	(13.10)
MergerDummy	0.00458	0.199	0.0838	-0.0360	-0.000136	10.50
	(0.00937)	(0.427)	(0.445)	(0.0668)	(0.0747)	(10.87)
Tier1	-0.0398	3.177	3.524	-1.052***	-1.222***	-35.21
	(0.0516)	(3.092)	(3.100)	(0.354)	(0.339)	(59.99)
Parent bank risk	0.116***	0.239**	0.222**	0.0721*	0.0546	0.439***
	(0.0337)	(0.113)	(0.103)	(0.0398)	(0.0332)	(0.152)
Dbank	-	-	-	-	-	-
Dlar	-0.00327	0.0498	-0.118	-0.00240	0.0458	-11.87***
	(0.00528)	(0.493)	(0.345)	(0.109)	(0.0555)	(2.936)
Dbetter	-0.00654	-0.293	-0.362	0.0796	0.102	6.003
	(0.0133)	(0.357)	(0.355)	(0.0508)	(0.0609)	(8.218)
Sharefem	-0.0476*	-2.728*		1.005*		
	(0.0268)	(1.538)		(0.547)		
DS_Sharefem	0.0726**	3.391		-0.926*		
	(0.0327)	(2.238)		(0.520)		
SharePhD						
DS_SharePhD						
ShareMBA						
DS_ShareMBA						
Shareforeign			-1.825***		0.634*	10.79
			(0.609)		(0.361)	(13.20)
DS_Shareforeign			14.74		1.363	66.80
			(17.43)		(3.251)	(168.9)
Constant	0.0829*	-1.350	-1.129	1.187***	1.010**	71.20*
	(0.0469)	(2.577)	(2.396)	(0.354)	(0.411)	(38.15)
Year dummies	YES	YES	YES	YES	YES	YES
Observations	76	102	102	100	100	108
R-squared	0.756	0.366	0.385	0.426	0.471	0.475
No. of Institutions	16	18	18	18	18	20

Notes: Estimation by fixed effects with clustered standard errors at bank level (in parentheses). The first line of Table 5 shows dependents in individual regressions. "DS*board variable" denotes interaction of building saving society dummy with corresponding board variable. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1.

Next, we focus on dividing Czech banking institutions by size. Table 6 shows that *the greater the amount of time directors spend on board* the lower the riskiness of large banks measured by NPL ratio, Z-score and ROA volatility. This result could be explained by the evidence presented by Coles *et al.* (2008) and Huang (2013) that board members in larger or more complex firms with greater advising need more time to familiarize themselves with corporate environment and to acquire enough knowledge to perform strategic decision-making which justifies longer average board tenure and also postpones potential entrenchment.

Furthermore, a higher *proportion of directors with a PhD* on boards of large banks increases their overall stability. This finding is in line with the risk-mitigating effect of directors holding a PhD by (Berger *et al.*, 2014) for German banks. Contrary to our research hypothesis and the

evidence presented by e.g.Campbell (2006), Bucciol & Miniaci (2011) or Grable *et al.* (2009), it also appears that with increasing *age* directors harm stability in large banks. However, the risk-enhancing effect of director age might be due to potential collinearity with director tenure in these regressions.

As for the effect of *foreign directors* on bank risk, the overall effect is not significant in large banks but in small and midsized banks foreigners on board harm stability captured by Z-score and increase profit volatility. The negative effect of foreign directors in small and midsized banks could be explained by the combination of two factors; one, their relative unfamiliarity with the local market and potential language barriers they might face and two, a relatively small size of management boards in the Czech building savings societies as reported in Table 2. Taken together the potential propensity of foreign directors to increase risk might not be sufficiently mitigated in smaller boards as it is easier for directors on such boards to reach consensus which might lead to more extreme decisions (Nakano & Nguyen, 2012).

Finally, there is some evidence on risk-increasing effect of board size in small and midsized banks when Z-score is used as the dependent. This finding corresponds with Eisenberg *et al.* (1998) who found a significant negative correlation between board size and profitability in a sample of small and midsized firms. However, the risk-increasing implication of board size in small and midsized banks is contrary to the board size hypothesis in Section 2. This could be justified by the fact that for small and midsized banks large boards might not be efficient as they often face problems of communication, coordination and decision-making while the need for a wide range of expertise and skill might not be so dire. Altogether the problems linked to board size can outweigh the risk-mitigating effect of large boards (Coles *et al.*, 2008); (Nakano & Nguyen, 2012).

Table 6: Impact of Board Characteristics on Bank Risk - By Size

VARIABLES	**NPLL**	**logZ**	**logZ**	**sROA**	**LAsfund**
Avrage	-0.00103	0.0370	0.0237	0.00339	0.333
	(0.00163)	(0.0497)	(0.0414)	(0.00837)	(0.463)
Dlar_Avrage	-0.000387	-0.180*	-0.160*	0.0213**	-0.729
	(0.00166)	(0.0931)	(0.0867)	(0.0100)	(1.548)
Boardsize	0.000260	-0.282*	-0.332*	0.0892	1.335
	(0.00394)	(0.159)	(0.181)	(0.0575)	(1.735)
Dlar_Boardsize	-0.00552	0.253	0.331	-0.0869	-1.695
	(0.00400)	(0.194)	(0.196)	(0.0525)	(2.663)
AvrBoardten	0.00528	-0.134	-0.167	0.0247	1.651
	(0.00321)	(0.110)	(0.110)	(0.0201)	(1.440)
Dlar_AvrBoardten	-0.00688**	0.911***	0.686***	-0.146***	2.007
	(0.00323)	(0.249)	(0.151)	(0.0231)	(3.137)
TAg	-0.116***	0.0517	-0.193	-0.121	2.365
	(0.0292)	(0.664)	(0.680)	(0.155)	(14.37)
Banksize	0.359**	-43.70***	-33.35**	7.365***	173.9
	(0.152)	(13.42)	(12.96)	(2.137)	(364.6)
Charterval	0.0733***	-0.730	-0.758	-0.0124	-2.852
	(0.0213)	(0.831)	(0.777)	(0.103)	(11.70)
MergerDummy	0.00541	0.331	0.190	-0.0320	7.908

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Table 6: Impact of Board Characteristics on Bank Risk - By Size (continued)

VARIABLES	**NPLL**	**logZ**	**logZ**	**sROA**	**LAsfund**
	(0.0113)	(0.331)	(0.335)	(0.0430)	(9.136)
Tier1	-0.0555	1.450	2.583	-0.972***	-38.51
	(0.0481)	(2.774)	(2.848)	(0.321)	(58.62)
Parent bank risk	0.139***	0.274**	0.205*	0.0395	0.468***
	(0.0233)	(0.129)	(0.107)	(0.0272)	(0.154)
Dbank	-	-	-	-	-
Dlar	0.0251	-1.716	-2.106*	0.600**	-4.417
	(0.0185)	(1.373)	(1.134)	(0.279)	(16.01)
Dbetter	-0.00717	0.123	0.0559	0.0236	8.695
	(0.0132)	(0.385)	(0.378)	(0.0496)	(9.273)
Sharefem					
Dlar_Sharefem					
SharePhD		-			
Dlar_SharePhD		5.845**			
		(2.738)			
ShareMBA					
Dlar_ShareMBA					
Shareforeign	-0.0194		-2.917***	1.126***	-8.189
	(0.0465)		(0.433)	(0.246)	(10.66)
Dlar_Shareforeign	0.0125		2.094*	-1.280**	73.15
	(0.0481)		(1.062)	(0.557)	(45.35)
Constant	0.0998***	0.988	1.099	0.451	68.40
	(0.0319)	(2.926)	(2.879)	(0.439)	(41.99)
Year dummies	YES	YES	YES	YES	YES
Observations	76	102	102	100	108
R-squared	0.773	0.424	0.453	0.599	0.474
No. of Institutions	16	18	18	18	20

Notes: Estimation by fixed effects with clustered standard errors at bank level (in parentheses). The first line of Table 6 shows dependents in individual regressions. "Dlar*board variable" denotes interaction of large bank dummy with corresponding board variable. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1.

It appears that the presence of *foreign directors* on management boards of sufficiently capitalized banks impairs bank stability captured by Z-score while there is no such pronounced effect for better than sufficiently capitalized banks. Given that capital increases monitoring and decreases moral hazard incentives in firms (Morrison & White, 2004); (Allen *et al.*, 2011), it could curb potential risk implications of foreign directors arising from their possible unfamiliarity with the local banking environment or language barriers they might face in the boardroom of better than sufficiently capitalized banks. The same, however, might not be true for sufficiently capitalized Czech banks, hence the negative effect of non-national directors on bank risk reported in Table 7.

As for *director tenure*, the longer the directors hold their positions on management boards of better than sufficiently capitalized banks, the greater the risk measured by NPL ratio. However, no director tenure effect is found in sufficiently capitalized banks. There exists at least partial

overlap of the better than sufficiently capitalized bank category and the segments of Czech building savings societies and of small and midsized banks as these are also better capitalized than the other category in each division, i.e. general commercial banks and large banks, respectively Table 3. Therefore, the same explanation as for building savings societies is relevant here; boards with long tenure are likely to be too set in their ways and to suffer from entrenchment, e.g. Huang (2013). The results are presented in detail in Table 7.

Table 7: Impact of Board Characteristics on Bank Risk - By Capitalization

VARIABLES	**NPLL**	**logZ**	**sROA**	**LAsfund**
Avrage	-0.00132	0.00972	0.00613	0.537
	(0.00388)	(0.0850)	(0.0221)	(1.537)
Dadeq_Avrage	0.000668	0.0279	-0.00922	-0.756
	(0.00386)	(0.102)	(0.0264)	(1.458)
Boardsize	0.00365	-0.0154	0.00698	-2.584
	(0.00559)	(0.201)	(0.0564)	(2.803)
Dadeq_Boardsize	-0.00747	-0.208	0.0478	3.039
	(0.00507)	(0.179)	(0.0428)	(2.467)
AvrBoardten	0.00696**	-0.0532	-0.0133	-0.929
	(0.00264)	(0.142)	(0.0267)	(1.638)
Dadeq_AvrBoardten	-0.00764***	0.0865	0.00108	6.196
	(0.00217)	(0.174)	(0.0561)	(4.380)
TAg	-0.121***	0.204	-0.276	-4.861
	(0.0269)	(0.595)	(0.186)	(16.71)
Banksize	0.448**	-27.50*	7.804**	148.1
	(0.159)	(14.83)	(2.732)	(289.4)
Charterval	0.0661***	-0.595	-0.0690	1.831
	(0.0205)	(0.810)	(0.149)	(11.24)
MergerDummy	0.00404	-0.0710	0.0182	8.740
	(0.0129)	(0.402)	(0.0712)	(7.569)
Tier1	-0.0326	3.886	-1.178***	-39.44
	(0.0603)	(2.424)	(0.241)	(55.09)
Parent bank risk	0.131***	0.134	0.0418	0.586***
	(0.0227)	(0.0956)	(0.0296)	(0.157)
Dbank	-	-	-	-
Dlar	-0.00277	-0.0530	0.0206	-13.10***
	(0.00459)	(0.418)	(0.0816)	(3.394)
Dbetter	-0.0408	-1.711	0.370*	17.84
	(0.0378)	(1.000)	(0.175)	(13.68)
Sharefem				
Dadeq_Sharefem				
SharePhD				
Dadeq_SharePhD				
ShareMBA				
Dadeq_ShareMBA				
Shareforeign	-0.0271	-0.214	0.450	27.07
	(0.0446)	(1.202)	(0.326)	(32.57)
Dadeq_Shareforeign	0.00910	-1.990*	0.253	-15.95

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Table 7: Impact of Board Characteristics on Bank Risk - By Capitalization (continued)

VARIABLES	**NPLL**	**logZ**	**sROA**	**LAsfund**
	(0.0324)	(1.128)	(0.225)	(29.55)
Constant	0.0972**	-0.0256	0.726*	72.51*
	(0.0419)	(2.434)	(0.416)	(40.90)
Year dummies	YES	YES	YES	YES
Observations	76	102	100	108
R-squared	0.794	0.399	0.471	0.491
No. of Institutions	16	18	18	20

Notes: Estimation by fixed effects with clustered standard errors at bank level (in parentheses). The first line of Table 7 shows dependents in individual regressions. "Dadeq*board variable" denotes interaction of dummy for banks meeting capital requirement with corresponding board variable. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1.

As for the impact of banks' financial characteristics on the measures of bank risk, in regressions for all bank categories we found evidence that bank size is a risk-contributing factor when Z-score, profit volatility or ratio of liquid assets over deposits and short-term funding are used as bank risk proxies. This could be attributed to a large banks' capacity to better absorb risk or to too-big-to-fail or too-systemic-to-fail policies put in place. In addition, capitalization lowers bank riskiness measured by profit volatility. This can be attributed to the fact that capital increases monitoring and decreases moral hazard incentives (Allen *et al.*, 2011); (Morrison & White, 2004). Similarly, growth of bank assets lowers risk captured by NPL ratio. In line with the almost exclusive foreign ownership of the Czech banking sector's assets, we found that the link between foreign parent bank group risk appetite and their Czech affiliates' risk is positive and significant across different dependents.

In subsection 5.3 we also test for the presence of any nonlinear relationship between board size and bank risk-taking in the Czech banking sector as detected in the literature by e.g. Coles *et al.* (2008) and Andres & Vallelado (2008). Furthermore, board tenure was shown to be either positively or negatively related to bank risk with the variations in this relation depending on firm characteristics. In line with Huang (2013) we test for presence of a potential U-shaped relationship between board tenure and riskiness in subsection 5.3.

5.3 Testing for Nonlinearities

Apart from observing linear relations between different board characteristics and performance, corporate governance literature also identified a nonlinear relation between board size and firm performance (Andres & Vallelado, 2008); (Coles *et al.*, 2008) and lately also between director tenure and performance (Huang, 2013). In light of the results presented in subsection 5.2, different impact of mainly average board tenure on riskiness in Czech building savings societies, large banks and better than sufficiently capitalized banks could be explained by the presence of nonlinearities in the data. Therefore, we now turn to testing for nonlinear relations between board tenure and risk-taking and board size and risk-taking in the Czech banking sector.

First, we add quadratic terms for board size and director tenure into baseline regressions in Table 4. Table C1 in Appendix C presents the results. For the Czech banking sector overall, no

relationship either linear or nonlinear has been found between board size and the risk proxies. While quadratic term for director tenure emerged significant in regressions with NPL ratio and Z-score as dependents, the relationship between director tenure and bank stability is not U-shaped. Moreover, the evidence is ambiguous as longer director tenure is shown to raise NPL ratio and Z-score as well. Therefore we can conclude that no clear evidence on the effect of director tenure was found for the whole sector. Similar to the results in Table 4, foreign directors raise riskiness measured by Z-score and ROA volatility.

Since regressions for different bank categories in subsection 5.2 reported contrasting impact of director tenure on risk-taking in building savings societies, large banks and better than sufficiently capitalized banks, we also check for the presence of nonlinearities for these categories. The calculations are reported in Appendix C.

For general commercial banks and building savings societies no nonlinearities emerged neither between board size nor director tenure versus risk-taking after having added quadratic terms and interactions of quadratic terms with building savings society dummy. Furthermore, not even linear effect between both observed variables and risk was detected in these specifications. The effects of other board variables remained qualitatively the same as in Table 5, apart from the effect of proportion of female directors on risk which is now significant only for risk captured by NPL ratio.

In terms of size of banking institutions, again no evidence for nonlinearities in either board size or director tenure was found for either size group. The impact of the remaining board variables on risk is qualitatively the same as in the regressions without added quadratic terms for board size and director tenure reported in Table 6. The only difference from results of original regressions by size in subsection 5.2 is the emergence of a positive effect of foreign directors on bank liquidity in large banks while we previously found no effect of foreigners on risk in large banks. As for the groups of the Czech banks by capitalization, no strong evidence on nonlinear effects between board size and director tenure was found, either (Table C4). For better than sufficiently capitalized banks, risk measured by NPL ratio remains increasing in director tenure similar to Table 7. As for other board variables, a larger proportion of non-national directors on board increases risk captured by profit volatility in better than sufficiently capitalized banks, an effect that is not reported in Table 7. However, given small differences between the two bank segments by capitalization as evidenced by the descriptive statistics in Table 2 and Table 3, the result is consistent with our original findings.

All in all, despite failing to find nonlinear effects of board size and director tenure versus measures of risk in the Czech banks, we have validated our original results about the existence of a linear relationship between director tenure and riskiness in the segments of large banks and better than sufficiently capitalized banks. However, the linear risk-increasing effect of board size as reported in Table 5 and Table 6 turns out not to be robust to inclusion of additional variables into regressions in Table C2 and Table C3.

6 Conclusions

In this paper, we investigate how banking institutions' management board composition impacts risk-taking behavior in the Czech Republic. More specifically, we examine what effect management boards of the Czech banks have on bank risk-taking in terms of average age of directors, proportion of female directors, non-national directors and proportion of their attained education. In addition, we also observe if a number of directors on management board and their average tenure affect bank risk captured by four different risk proxies in any way.

To perform the analysis, we prepare a unique data set that comprises selected biographical information on management board members of the Czech banking institutions. We then combine this data set with individual bank financial data to serve as control variables in our analysis. We use 4 bank risk proxies that capture different aspects of bank risk; Z-score, profit volatility, NPL ratio and the ratio of liquid assets to deposits and short-term funding.

For the Czech banking sector overall , we find that a larger proportion of non-national directors on board decreases bank stability captured by Z-score and increases bank profit volatility measured by ROA volatility. Moreover, foreign directors have risk-enhancing effect across several categories of banking institutions, while for building saving societies, large banks and better capitalized banks the effect of foreign directors is not significant. This finding opposes evidence typically found in the literature (Oxelheim & Randoy, 2003) that non-national directors by bringing new technology and modern managerial techniques into the firm have a positive effect on its performance. The risk increasing effect of foreign directors could, however, be explained by a lack of familiarity with the Czech banking environment or by language and cultural barriers foreign directors might face in the boardroom (European Commission, 2010).

As for the attained education, larger proportions of directors holding an MBA on management boards in the Czech banking sector overall raise riskiness captured by ROA volatility. However, we find no effect of directors with MBA on risk-taking across individual bank categories. The findings are in line with (Bertrand & Schoar, 2003) who show that directors holding an MBA degree tend to be more aggressive and pursue riskier firm policies. As for the the proportion of directors with a PhD, we find that they have a stability-enhancing effect in large banks. The risk-reducing effect of directors with a PhD aligns with evidence presented by Berger *et al.* (2014) that better educated directors curb risk-taking. However, no effect on bank risk, either positive or negative, has been found for other categories of the Czech banking institutions in our sample. These findings shed some light on the potentially different risk implications of differences in directors' degrees.

The evidence on the effect of female directors is ambiguous for Czech general commercial banks. Female directors decrease commercial banks' riskiness if NPL ratio is used as a measure of risk. However, the effect is opposite when Z-score and ROA volatility are used as dependent variables. On the other hand, for building savings societies a larger proportion of female directors on board aggravates riskiness. All in all, these results contribute to the mixed evidence on

the effect of female directors on corporate performance found in the literature, e.g. (Barber & Odean, 2001), (Adams & Ferreira, 2007).

Despite abundant evidence found in the literature that board size impacts firm's performance, e.g. Dalton *et al.* (1999), Lipton & Lorsch (1992) or Jensen (1993), we did not find strong evidence on bank risk for the Czech banks overall. The exceptions are building savings societies where larger board size enhances risk captured by non-performing loans ratio and small and midsized banks whose stability measured by Z-scores decreases in board size. These findings are in line with Eisenberg *et al.* (1998) who found a significant negative correlation between board size and profitability in a sample of small and midsized firms where Czech building savings societies belong, as well.

In regards to director tenure, its effect on riskiness varies for different categories of Czech banking institutions. In building savings societies, riskiness captured by Z-score and ROA volatility increases in board tenure, while in better capitalized banks higher board tenure increases risk measured by non-performing loans ratio. On the other hand, stability is increasing in board tenure in large banks. These findings are broadly in line with Huang (2013) who claims that board tenure can be positively or negatively related to firm value and this relation varies across firm characteristics. As for average age of directors, we found no strong and systematic evidence of its effect on riskiness in the Czech banking sector.

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A Summary Statistics

Table A1: Descriptive statistics of variables in the data set

Variable	N	Mean	SD	Min	Max
Risk measures					
NPLL	133	0.05	0.05	0.00	0.25
LAsfund	173	33.84	35.59	0.06	367.18
logZ	169	3.93	1.06	1.51	7.45
sROA	169	0.33	0.41	0.00	2.92
Board variables					
Boardsize	188	4.18	1.47	2.00	9.00
Avrage	177	0.09	2.95	-12.67	10.31
Avrboardten	177	0.23	1.20	-6.60	1.88
Sharefem	177	0.00	0.07	-0.33	0.33
SharePhD	177	0.00	0.05	-0.33	0.25
ShareMBA	177	0.00	0.10	-0.33	0.33
Shareforeign	188	0.33	0.26	0.00	1.00
Control variables					
TAg	168	0.15	0.22	-0.12	2.31
Banksize	168	0.00	0.01	-0.12	0.02
Charterval	147	-0.01	0.12	-0.56	0.41
MergerDummy	188	0.10	0.30	0.00	1.00
Tier1	158	0.91	0.11	0.60	1.33
DS	252	0.24	0.43	0.00	1.00
Dlar	252	0.19	0.39	0.00	1.00
Dadeq	252	0.71	0.45	0.00	1.00
Parent bank risk measures					
mNPLL	139	0.07	0.09	0.00	0.76
mLAsfund	173	41.03	32.00	4.40	367.18
logmZ	194	3.62	1.07	1.03	5.61
msROA	175	-0.03	0.98	-3.01	3.28

Notes: N = number of observations, SD = standard deviation, Min = minimum value and Max = maximum value.

B Results of Endogeneity Testing

Table B1: Testing for Endogeneity - GMM Approach

VARIABLES	**NPLL**	**logZ**	**sROA**	**LAsfund**
fdAvrage	-0.00209	-0.225	0.0348	-6.121
	(0.00432)	(0.483)	(0.0562)	(4.975)
Boardsize	0.0143	0.145	-0.0331	-28.66
	(0.0150)	(0.209)	(0.163)	(16.75)
AvrBoardten	0.0190*	0.0556	-0.290	1.288
	(0.00998)	(1.692)	(0.167)	(7.109)
TAg	-0.00255	1.420	0	-22.18
	(0.0208)	(3.307)	(0)	(38.99)
Banksize	0	0	0	0
	(0)	(0)	(0)	(0)
Charterval	0	0.120	0.660	-193.5
	(0)	(5.466)	(1.641)	(153.9)
MergerDummy	-0.151	1.543	0.161	24.27
	(0.105)	(2.555)	(1.194)	(25.18)
Tier1	-0.00537	0	0.387	274.0*
	(0.0714)	(0)	(0.815)	(145.6)
Parent bank risk	0	0.0120	0.0661	-0.578
	(0)	(0.456)	(0.128)	(0.799)
Sharefem	0	0	0	0
	(0)	(0)	(0)	(0)
SharePhD	0	0	0	0
	(0)	(0)	(0)	(0)
ShareMBA	0.223	-8.126	-1.534	-372.3
	(0.179)	(7.358)	(1.828)	(274.7)
Shareforeign	0	0	0	38.74
	(0)	(0)	(0)	(173.7)
Constant	0	0	0	0
	(0)	(0)	(0)	(0)
Year dummies	YES	YES	YES	YES
Observations	76	102	100	108
No. of Institutions	16	18	18	20
Difference-in-Hansen test (p-value)	1	1	1	1
No. of instruments	78	94	92	94

Notes: Estimation of Equation 2 by GMM with Arellano-Bond two-step system estimator with heteroskedasticity-corrected standard errors and Windmeijer small sample size adjustment. The first line of Table B1 shows dependents in individual regressions. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1. Standard errors in parentheses.

Table B2: 2SLS Regressions - Dependent: NPL Ratio

VARIABLES	**NPLL**	**NPLL**	**NPLL**	**NPLL**
fdAvrage	0.00244*	0.00304**	0.00234*	0.00117
	(0.00132)	(0.00128)	(0.00124)	(0.00106)
Boardsize	0.00248	0.00408	0.00231	-0.00111
	(0.00227)	(0.00257)	(0.00210)	(0.00174)
AvrBoardten	-0.00376	-0.00689*	-0.00326	0.000731
	(0.00343)	(0.00361)	(0.00321)	(0.00254)
TAg	-0.0345	-0.0440	-0.0587*	-0.0319

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Table B2: 2SLS Regressions - Dependent: NPL Ratio (continued)

VARIABLES	**NPLL**	**NPLL**	**NPLL**	**NPLL**
	(0.0386)	(0.0388)	(0.0329)	(0.0299)
Banksize	0.554	0.909***	0.916**	0.523
	(0.396)	(0.352)	(0.417)	(0.324)
Charterval	0.0420*	0.0265	0.0269	0.0506***
	(0.0218)	(0.0203)	(0.0214)	(0.0196)
MergerDummy	0.0350*	0.0322*	0.0308	0.0325*
	(0.0212)	(0.0184)	(0.0192)	(0.0172)
Tier1	-0.0767	-0.0823*	-0.0587	-0.147***
	(0.0485)	(0.0483)	(0.0496)	(0.0412)
Parent bank risk	0.0261	0.0472	0.0478	0.105***
	(0.0448)	(0.0371)	(0.0350)	(0.0252)
Sharefem	-0.0539			
	(0.0704)			
SharePhD		-0.189***		
		(0.0717)		
ShareMBA			-0.114*	
			(0.0648)	
Shareforeign				0.0665***
				(0.0105)
Constant	0.122**	0.124**	0.110**	0.185***
	(0.0541)	(0.0538)	(0.0541)	(0.0436)
Year dummies	YES	YES	YES	YES
Observations	77	77	77	80
R-squared	0.313	0.310	0.338	0.529
Hansen J statistic	1.77	7.378	1.575	1.675
Chi-sq(2) P-val	0.4127	0.025	0.4549	0.4328
C statistic	0.444	0.021	0.006	3.689
Chi-sq(1) P-val	0.5051	0.8856	0.938	0.0548
No. of instruments	3	3	3	3

Notes: Estimation by 2SLS with robust standard errors and lags of 1-3 of director variables used as instruments. The first line of Table B2 shows dependent in each regression. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1. Standard errors in parentheses.

Table B3: 2SLS Regressions - Dependent: Z-score

VARIABLES	**logZ**	**logZ**	**logZ**	**logZ**
fdAvrage	0.0552*	0.0395	0.0387	0.0587
	(0.0308)	(0.0306)	(0.0327)	(0.0378)
Boardsize	-0.0604	-0.0244	-0.0351	-0.0138
	(0.0611)	(0.0671)	(0.0632)	(0.0539)
AvrBoardten	-0.0587	-0.0396	-0.0165	-0.0502
	(0.0850)	(0.0806)	(0.0962)	(0.0951)
TAg	0.382	-0.199	-0.657	0.337
	(1.091)	(1.097)	(1.075)	(1.092)
Banksize	1.108	7.341	13.72	-2.888
	(23.54)	(23.72)	(21.96)	(24.05)
Charterval	-0.163	0.0389	0.0149	-0.0738
	(0.750)	(0.881)	(1.032)	(1.027)
MergerDummy	0.558*	0.432	0.445	0.511*
	(0.333)	(0.346)	(0.348)	(0.285)
Tier1	-0.463	0.420	0.518	1.027
	(1.224)	(1.387)	(1.522)	(1.303)
Parent bank risk	0.0119	-0.0728	-0.0283	-0.00228

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Table B3: 2SLS Regressions - Dependent: Z-score (continued)

VARIABLES	**logZ**	**logZ**	**logZ**	**logZ**
	(0.0838)	(0.0926)	(0.0935)	(0.0954)
Sharefem	-1.898			
	(1.565)			
SharePhD		-3.006		
		(2.493)		
ShareMBA			-1.803*	
			(1.045)	
Shareforeign				-0.567*
				(0.304)
Constant	4.915***	4.275***	4.135**	3.463**
	(1.440)	(1.508)	(1.664)	(1.426)
Year dummies	YES	YES	YES	YES
Observations	82	82	82	86
R-squared	0.131	0.155	0.146	0.155
Hansen J statistic	0.373	1.35	2.168	0.208
Chi-sq(2) P-val	0.8299	0.509	0.3382	0.9012
C statistic	1.252	0.165	2.065	0.354
Chi-sq(1) P-val	0.2633	0.6849	0.1508	0.552
No. of instruments	3	3	3	3

Notes: Estimation by 2SLS with robust standard errors and lags of 1-3 of director variables used as instruments. The first line of Table B3 shows dependent in each regression. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1. Standard errors in parentheses.

Table B4: 2SLS Regressions - Dependent: sROA

VARIABLES	**sROA**	**sROA**	**sROA**	**sROA**
fdAvrage	-0.00501	0.00114	-0.00163	0.000115
	(0.00589)	(0.00748)	(0.00618)	(0.00739)
Boardsize	0.0283***	0.0237**	0.0278***	0.0212**
	(0.0102)	(0.0106)	(0.0106)	(0.00885)
AvrBoardten	0.00107	-0.00311	-0.00705	-0.00931
	(0.0178)	(0.0148)	(0.0193)	(0.0190)
TAg	0.135	0.173	0.125	0.114
	(0.188)	(0.206)	(0.158)	(0.178)
Banksize	-2.158	-1.138	-2.769	-0.215
	(5.111)	(4.987)	(4.158)	(5.446)
Charterval	0.145	0.146	0.131	0.0472
	(0.107)	(0.165)	(0.131)	(0.196)
MergerDummy	-0.0291	-0.0297	-0.00766	-0.0718
	(0.0741)	(0.0727)	(0.0676)	(0.0503)
Tier1	0.0946	0.201	0.0724	0.0367
	(0.219)	(0.227)	(0.188)	(0.215)
Parent bank risk	0.00139	-0.00456	-0.00309	0.00435
	(0.0152)	(0.0148)	(0.0127)	(0.0208)
Sharefem	0.329**			
	(0.153)			
SharePhD		0.715		
		(0.728)		
ShareMBA			0.221	
			(0.177)	
Shareforeign				0.243***
				(0.0635)
Constant	-0.0650	-0.151	-0.0464	-0.0265

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Table B4: 2SLS Regressions - Dependent: sROA (continued)

VARIABLES	**sROA**	**sROA**	**sROA**	**sROA**
	(0.238)	(0.252)	(0.200)	(0.237)
Year dummies	YES	YES	YES	YES
Observations	81	81	81	85
R-squared	0.173	0.211	0.188	0.225
Hansen J statistic	2.655	2.397	1.166	1.101
Chi-sq(2) P-val	0.2652	0.3016	0.5583	0.5765
C statistic	0.286	2.34	0.638	0.224
Chi-sq(1) P-val	0.593	0.1261	0.4245	0.6364
No. of instruments	3	3	3	3

Notes: Estimation by 2SLS with robust standard errors and lags of 1-3 of director variables used as instruments. The first line of Table B4 shows dependent in each regression. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1. Standard errors in parentheses.

C Results of Nonlinearity Testing

Table C1: Testing for the effect of nonlinearities - Baseline

textitVARIABLES	**NPLL**	**logZ**	**sROA**	**LAsfund**
fdAvrage	-0.000987	-0.00394	0.00389	0.0250
	(0.00125)	(0.0393)	(0.00765)	(0.611)
Boardsize	0.0254	-0.263	0.00244	0.276
	(0.0194)	(0.440)	(0.107)	(7.293)
sq_Boardsize	-0.00242	0.00747	0.00324	-0.109
	(0.00157)	(0.0313)	(0.00708)	(0.588)
AvrBoardten	0.00479*	0.126	-0.0184	3.558
	(0.00225)	(0.113)	(0.0302)	(2.540)
sq_AvrBoardten	0.00379**	0.0520***	-0.00298	0.598
	(0.00165)	(0.0170)	(0.00394)	(0.504)
TAg	-0.126***	0.389	-0.342	-0.416
	(0.0308)	(0.783)	(0.209)	(14.29)
Banksize	0.272	-37.56**	9.586***	100.9
	(0.201)	(14.96)	(2.828)	(308.0)
Charterval	0.0740***	-0.826	-0.0374	-0.667
	(0.0196)	(0.820)	(0.123)	(13.10)
MergerDummy	0.00221	0.161	-0.00186	11.50
	(0.0108)	(0.444)	(0.0747)	(11.05)
Tier1	-0.0450***	2.494	-0.814**	-2.566
	(0.0112)	(2.182)	(0.287)	(28.51)
mNPLL	0.141***	0.207**	0.0544	0.412**
	(0.0193)	(0.0958)	(0.0347)	(0.161)
Sharefem				
SharePhD				
ShareMBA				
Shareforeign	-0.0154	-1.733**	0.634*	13.60
	(0.0336)	(0.643)	(0.332)	(13.18)
Constant	0.0761*	0.521	0.833	50.20*
	(0.0426)	(2.868)	(0.599)	(28.03)
Year dummies	YES	YES	YES	YES
Observations	76	102	100	108
R-squared	0.783	0.369	0.435	0.440
No. of Institutions	16	18	18	20

Notes: Estimation by fixed effects with clustered standard errors at bank level (in parentheses). The first line of Table C1 shows dependents in individual regressions. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1.

Table C2: Testing for the effect of nonlinearities - By Business Model

VARIABLES	**NPLL**	**logZ**	**logZ**	**sROA**	**LAsfund**
Avrage	-0.00106	-0.0240	-0.0430	0.0119	-0.197
	(0.00142)	(0.0547)	(0.0436)	(0.00974)	(0.750)
DS_Avrage	0.00148	0.119	0.131	-0.0234	1.468
	(0.00232)	(0.157)	(0.144)	(0.0282)	(2.002)
Boardsize	0.0254	-0.479	-0.463	0.0533	-6.715

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Table C2: Testing for the effect of nonlinearities - By Business Model (continued)

VARIABLES	**NPLL**	**logZ**	**logZ**	**sROA**	**LAsfund**
	(0.0237)	(0.509)	(0.525)	(0.111)	(12.96)
sq_Boardsize	-0.00248	0.0247	0.0223	-0.00121	0.599
	(0.00193)	(0.0398)	(0.0404)	(0.00771)	(1.164)
DS_Boardsize	-	4.866	11.05	1.413	-91.89
		(15.84)	(13.82)	(3.515)	(289.5)
DS_sq_Boardsize	-0.000863	-0.613	-1.475	-0.196	14.76
	(0.00361)	(2.226)	(1.946)	(0.490)	(40.89)
AvrBoardten	0.00540	0.210	0.215	-0.0357	3.234
	(0.00312)	(0.184)	(0.175)	(0.0379)	(1.952)
sq_AvrBoardten	0.00451**	0.0686	0.0357	0.0147	-1.165
	(0.00207)	(0.0728)	(0.0855)	(0.0158)	(1.674)
DS_AvrBoardten	-0.0104	-0.266	-0.165	0.0946	-2.663
	(0.0170)	(0.358)	(0.345)	(0.0627)	(5.174)
DS_sq_AvrBoardten	0.00517	-0.0225	0.0662	-0.00273	0.520
	(0.0222)	(0.158)	(0.160)	(0.0266)	(2.546)
TAg	-0.128***	0.420	0.437	-0.349	-1.809
	(0.0309)	(0.961)	(0.784)	(0.235)	(15.97)
Banksize	0.276	-40.89**	-39.81***	9.639***	156.8
	(0.206)	(14.58)	(13.48)	(3.278)	(336.3)
Charterval	0.0702***	-0.969	-0.969	-0.00818	0.259
	(0.0208)	(1.034)	(1.020)	(0.137)	(13.04)
MergerDummy	0.00360	0.288	0.144	0.00775	10.22
	(0.0128)	(0.461)	(0.477)	(0.0836)	(10.62)
Tier1	-0.0205	3.228	3.600	-1.174***	-42.15
	(0.0522)	(3.289)	(3.232)	(0.361)	(70.70)
Parent bank risk	0.117***	0.272*	0.224*	0.0554	0.483**
	(0.0317)	(0.147)	(0.128)	(0.0356)	(0.193)
Dbank	-	-	-	-	-
Dlar	-0.00708	-0.00493	-0.136	0.0335	-10.80***
	(0.00423)	(0.480)	(0.340)	(0.0620)	(2.900)
Dbetter	-0.00579	-0.272	-0.335	0.104	6.303
	(0.0124)	(0.390)	(0.391)	(0.0630)	(8.588)
Sharefem	-0.0562***	-2.908*			
	(0.0174)	(1.453)			
DS_Sharefem	0.0766**	3.187			
	(0.0305)	(2.039)			
SharePhD					
DS_SharePhD					
ShareMBA					
DS_ShareMBA					
Shareforeign			-1.757**	0.645*	10.63
			(0.764)	(0.352)	(14.35)
DS_Shareforeign			-	-	-
Constant	0.0622	-2.256	-3.869	0.109	133.1
	(0.0751)	(7.084)	(6.509)	(1.682)	(140.7)
Year dummies	YES	YES	YES	YES	YES
Observations	76	102	102	100	108
R-squared	0.796	0.376	0.391	0.477	0.481
No. of Institutions	16	18	18	18	20

Notes: Estimation by fixed effects with clustered standard errors at bank level (in parentheses). The first line of Table C2 shows dependents in individual regressions. "sq_Boardsize" and "sq_AvrBoardten" denote quadratic terms of corresponding board variables, "DS_sq_Boardsize" and "DS_sq_AvrBoardten" denote interactions of building saving society dummy with quadratic terms of corresponding board variables. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1.

Table C3: Testing for the effect of nonlinearities - By Size

VARIABLES	**NPLL**	**logZ**	**logZ**	**sROA**	**sROA**	**LAsfund**
Avrage	-0.00233	0.0455	0.0314	-0.00630	0.000916	0.176
	(0.00183)	(0.0433)	(0.0402)	(0.0152)	(0.00903)	(0.484)
Dlar_Avrage	0.000962	-0.183**	-0.170**	0.0327*	0.0237**	-0.809
	(0.00158)	(0.0846)	(0.0760)	(0.0179)	(0.0110)	(1.474)
Boardsize	-0.0345	-0.134	0.164	-0.0452	-0.186*	3.669
	(0.0445)	(0.535)	(0.501)	(0.134)	(0.0931)	(11.16)
sq_Boardsize	0.00430	-0.00998	-0.0507	0.0108	0.0308**	-0.522
	(0.00490)	(0.0567)	(0.0522)	(0.0148)	(0.0140)	(1.247)
Dlar_Boardsize	0.0805	2.257	1.660	-0.280	0.0675	-58.88**
	(0.0599)	(1.380)	(1.228)	(0.308)	(0.310)	(22.20)
Dlar_sq_Boardsize	-0.00853	-0.167	-0.102	0.0154	-0.0209	4.965**
	(0.00608)	(0.121)	(0.111)	(0.0272)	(0.0299)	(2.106)
AvrBoardten	0.00716	-0.0516	-0.0819	0.0174	0.0293	3.501
	(0.00428)	(0.144)	(0.146)	(0.0336)	(0.0319)	(2.383)
sq_AvrBoardten	0.00435	0.0266	0.0262	0.00145	0.00193	0.610
	(0.00276)	(0.0273)	(0.0275)	(0.00604)	(0.00597)	(0.495)
Dlar_AvrBoardten	-0.00495	0.930**	0.754***	-0.163***	-0.142***	1.144
	(0.00514)	(0.376)	(0.252)	(0.0535)	(0.0444)	(2.929)
Dlar_sq_AvrBoardten	-0.000847	0.123	0.140	0.00254	0.000912	-0.767
	(0.00368)	(0.114)	(0.115)	(0.0214)	(0.0218)	(1.245)
TAg	-0.124***	-0.118	-0.327	-0.267	-0.154	2.592
	(0.0315)	(0.718)	(0.742)	(0.304)	(0.123)	(13.91)
Banksize	0.188	-42.93***	-35.41***	9.319**	7.081***	118.5
	(0.230)	(12.31)	(11.31)	(3.611)	(2.107)	(292.6)
Charterval	0.0771***	-1.337	-1.290	0.0260	0.00546	2.737
	(0.0230)	(0.908)	(0.986)	(0.140)	(0.148)	(14.64)
MergerDummy	-0.00162	0.365	0.253	-0.0510	-0.0386	10.44
	(0.0101)	(0.380)	(0.394)	(0.0548)	(0.0479)	(10.56)
Tier1	0.0358	2.759	3.775	-0.860*	-1.034**	-56.30
	(0.0673)	(2.968)	(3.255)	(0.429)	(0.419)	(58.51)
Parent bank risk	0.154***	0.283*	0.245*	0.0522	0.0373	0.532***
	(0.0283)	(0.151)	(0.127)	(0.0354)	(0.0275)	(0.164)
Dbank	-	-	-	-	-	-
Dlar	-0.183	-7.599*	-6.380*	1.096	0.391	150.8**
	(0.144)	(3.936)	(3.344)	(0.842)	(0.830)	(54.99)
Dbetter	-0.0150	-0.0986	-0.154	0.0367	0.0386	10.30
	(0.0132)	(0.386)	(0.397)	(0.0604)	(0.0548)	(9.140)
Sharefem						
Dlar_Sharefem						
SharePhD		-		-		
Dlar_SharePhD		5.638*		-0.790*		
		(2.987)		(0.449)		
ShareMBA	-0.0301					
	(0.0226)					
Dlar_ShareMBA	0.0747*					
	(0.0415)					
Shareforeign			-2.800***		1.188***	-13.63
			(0.349)		(0.226)	(11.58)
Dlar_Shareforeign			1.332		-1.259**	96.83**
			(1.434)		(0.564)	(42.94)
Constant	0.0846	-1.086	-1.505	0.831*	1.015*	85.59
	(0.0793)	(3.471)	(3.778)	(0.472)	(0.523)	(55.21)

Continued on next page

Table C3: Testing for the effect of nonlinearities - By Size (continued)

VARIABLES	**NPLL**	**logZ**	**logZ**	**sROA**	**sROA**	**LAsfund**
Year dummies	YES	YES	YES	YES	YES	YES
Observations	76	102	102	100	100	108
R-squared	0.824	0.460	0.489	0.475	0.616	0.501
No. of Institutions	16	18	18	18	18	20

Notes: Estimation by fixed effects with clustered standard errors at bank level (in parentheses). The first line of Table C3 shows dependents in individual regressions. "sq_Boardsize" and "sq_AvrBoardten" denote quadratic terms of corresponding board variables, "Dlar_sq_Boardsize" and "Dlar_sq_AvrBoardten" denote interactions of large bank dummy with quadratic terms of corresponding board variables. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1.

Table C4: Testing for the effect of nonlinearities - By Capitalization

textitVARIABLES	**NPLL**	**logZ**	**sROA**	**LAsfund**
Avrage	-0.00202	0.0734	0.00292	0.923
	(0.00459)	(0.0824)	(0.0247)	(1.387)
Dadeq_Avrage	0.000970	-0.0616	-0.00885	-1.119
	(0.00457)	(0.123)	(0.0320)	(1.489)
Boardsize	-0.0255	0.880	-0.0408	20.96
	(0.0323)	(0.945)	(0.208)	(13.38)
sq_Boardsize	0.00346	-0.0727	0.00390	-2.725*
	(0.00311)	(0.0713)	(0.0136)	(1.515)
Dadeq_Boardsize	0.0353	-1.848**	0.117	-23.36
	(0.0257)	(0.866)	(0.159)	(20.61)
Dadeq_sq_Boardsize	-0.00475	0.146*	-0.00648	3.028
	(0.00285)	(0.0762)	(0.0128)	(2.228)
AvrBoardten	0.00751**	0.149	-0.0352	-0.767
	(0.00335)	(0.213)	(0.0481)	(2.008)
sq_AvrBoardten	0.00433	0.0562*	-0.00611	0.0891
	(0.00423)	(0.0297)	(0.00763)	(0.366)
Dadeq_AvrBoardten	-0.00410	0.0856	0.0544	5.034
	(0.00380)	(0.430)	(0.0948)	(4.290)
Dadeq_sq_AvrBoardten	-0.00130	0.0359	0.0259	-0.789
	(0.00448)	(0.128)	(0.0223)	(0.965)
TAg	-0.122***	0.252	-0.219	-3.320
	(0.0239)	(0.984)	(0.179)	(18.19)
Banksize	0.237	-26.37	6.371**	150.3
	(0.229)	(17.61)	(2.425)	(311.2)
Charterval	0.0752***	-0.889	-0.0666	7.279
	(0.0230)	(0.917)	(0.133)	(12.50)
MergerDummy	-0.00195	0.0678	0.0205	8.674
	(0.0143)	(0.511)	(0.0928)	(8.408)
Tier1	0.00164	3.972	-1.043***	-41.25
	(0.0631)	(2.373)	(0.302)	(56.40)
Parent bank risk	0.148***	0.193	0.0365	0.638***
	(0.0271)	(0.122)	(0.0276)	(0.193)
Dbank	-	-	-	-
Dlar	-0.00467	-0.222	-0.00577	-13.54***
	(0.00795)	(0.575)	(0.121)	(2.668)
Dbetter	0.0493	-5.297*	0.582	-38.69
	(0.0517)	(2.598)	(0.446)	(46.03)
Sharefem				
Dadeq_Sharefem				

Continued on next page

Table C4: Testing for the effect of nonlinearities - By Capitalization (continued)

textitVARIABLES	**NPLL**	**logZ**	**sROA**	**LAsfund**
SharePhD				
Dadeq_SharePhD				
ShareMBA		-3.074*		
		(1.683)		
Dadeq_ShareMBA		4.009**		
		(1.872)		
Shareforeign	-0.0233		0.507*	25.64
	(0.0412)		(0.271)	(37.46)
Dadeq_Shareforeign	0.0106		0.248	-17.12
	(0.0351)		(0.267)	(34.71)
Constant	0.0890	0.774	0.572	81.21
	(0.115)	(2.850)	(0.735)	(70.04)
Year dummies	YES	YES	YES	YES
Observations	76	102	100	108
R-squared	0.820	0.450	0.486	0.499
No. of Institutions	16	18	18	20

Notes: Estimation by fixed effects with clustered standard errors at bank level (in parentheses). The first line of Table C4 shows dependents in individual regressions. "sq_Boardsize" and "sq_AvrBoardten" denote quadratic terms of corresponding board variables. "Dadeq_sq_Boardsize" and "Dadeq_sq_AvrBoardten" denote interactions of sufficiently capitalized bank dummy with quadratic terms of corresponding board variables. For definition of variables, see Table 1. Significance levels: "***", p-value < 0.01, "**", p-value < 0.05, "*", p-value < 0.1.

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