

## Chair-CEO generation gap and bank risk-taking

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### Abstract

Poor bank governance has disastrous consequences for economies as the 2007-2009 financial crisis has shown. In the aftermath, board diversity is identified as an effective mechanism to enhance bank governance. Diversity, creating cognitive conflict between board members, is expected to enhance board's independence of thought to better perform monitoring and advising functions. Age is a key demographic measure and age dissimilarity between the chair and the CEO in non-financial firms leads to better economic outcomes (Goergen et al., 2015). In this paper, we examine whether chair-CEO age dissimilarity can mitigate banks' excessive risk-taking behaviour. Using a unique sample of 100 listed banks in Europe between 2005 and 2014, we find that age difference between the chair and the CEO reduces bank risk-taking. A chair-CEO generational gap –defined as a minimum of 20 years' age difference– has a larger impact in reducing risk-taking.

**Keywords:** Bank governance, board diversity, age difference, generational gap, bank risk-taking, European banks

**JEL classification:** G3, G21, G28, G39

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## 1. Introduction

The 2007-2009 financial crises revealed how excessive risk-taking behaviour can cause instability in the banking sector and catalyse turmoil in the overall financial system. Inadequate governance practices of banks have been highlighted as one of the causes of the crisis (Diamond & Rajan, 2009; Kirkpatrick, 2009; Beltratti & Stulz, 2012; Peni & Vähämaa, 2012). In the post-crisis era, policy makers emphasize that improved and more effective governance has a role in curbing banks' excessive risk-taking behaviour, which is critical to the soundness of the financial system (Bank for International Settlements, 2014) as well as to the avoidance of substantial taxpayer costs linked to the bailout of failed banks.

The opacity and complexity of banking assets exacerbate information asymmetries between managers, shareholders and stakeholders, resulting in constraints to the design of effective governance mechanisms for monitoring and controlling bank risk-taking (Furfine, 2001; Morgan, 2002; Adams & Mehran, 2003; Wilson et al., 2010; Becht et al., 2011; Leventis et al., 2013). Severity of information asymmetries, coupled with highly leveraged capital structures, may incentivise banks to take-on excessive risks without being adequately monitored and evaluated by external stakeholders (Diamond, 1984). In addition, deposit insurance and other safety net subsidies can lead to moral hazard and adverse selection issues that incentivize bank risk-taking (Molyneux et al., 2014). Furthermore, opaqueness of the banking business weakens competitive market powers that discipline managers via takeover pressures prevailing in other sectors (Levine, 2004; Leventis et al., 2013). The 2007-2009 financial crisis showed that the external governance of banks through regulation and supervision, and internal corporate governance were not adequate (Minton et al., 2014). However, there is a growing recognition that internal corporate governance mechanisms have the ultimate responsibility to enhance bank stability through effective monitoring and controlling of risk-taking (Srivastav & Hagendorff, 2015).

Board diversity enhances internal corporate governance. Diversity is related to a less homogenous board with members having a range of different skills, experiences and demographics. It can have positive effects on board performance through better decision making by bringing varied perspectives to boards (Arfken et al., 2004; Van der Walt et al., 2006), and by enhancing board's independence of thought to fulfil its advising and monitoring functions (Adams & Ferreira, 2009). Research on board diversity has received much attention recently and there is an increasing interest in understanding the link between bank-risk taking behaviour and board attributes<sup>1</sup> and demographics<sup>2</sup>. Diversity also enhances the board decision-making processes through members'

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<sup>1</sup> Akhigbe and Martin (2008), Pathan (2009), Fortin et al. (2010), Peni and Vähämaa (2012), Beltratti and Stulz (2012), Adams (2012), Erkens et al. (2012), Wang and Hsu (2013), Minton et al. (2014), Berger et al. (2014), Faleye and Krishnan (2015), and Mollah et al. (2016).

<sup>2</sup> Berger et al. (2014), Minton et al. (2014), Elyasiani and Zhang (2015) and Dong et al. (2017).

interaction with each other. The effectiveness of decision-making as a group through interaction can be influenced by the level of cognitive conflict within the board (Adams & Ferreira, 2007; Goergen et al., 2015). Board members' judgements and evaluations on strategic issues should be superior if decisions are taken through discussions triggered by cognitive conflict arising from their demographic differences. This hypothesis is broadly based on the sociological theories of *homophily* and *upper echelons*. The former predicts a higher frequency of interactions and personal connection between people who have similar social or demographic attributes (McPherson et al., 2001). The latter suggests that demography substantially influence executives understanding of the various managements situations they face and affects their decisions (Hambrick & Mason, 1984). Overall, similarities between board members may lead to more social ties, resulting in more affirmative interaction and a lack of diversity of views on key board decisions. In contrast, dissimilarities may result in more disagreements among board members, enhancing the quality of decision-making in uncertain environments such as banking (Forbes & Milliken, 1999).

In this paper, we examine whether demographic dissimilarities between the chair and the CEO have an impact on bank risk-taking behaviour. Our key demographic dissimilarity measure is age. Age demography plays an important role when group members interact among themselves (Ferris et al., 1991). When board members are from the same generation, sharing similar historical events and social trends, they are mentally connected and similarly minded in the corporate governance process (Wagner et al., 1984; Bantel & Jackson, 1989; Harrison et al., 1998; Pelled et al., 1999). As a consequence, chairs and CEOs of a similar age are likely to have fewer cognitive conflicts which may lessen board's monitoring capacity. In contrast, a greater chair-CEO age dissimilarity can cause more cognitive conflicts leading to more board independence and better monitoring (Adams & Ferreira, 2007; Goergen et al., 2015). We hypothesise that an increase in the cognitive conflicts triggered by chair-CEO age difference can be beneficial for controlling and curbing bank risk-taking behaviour. We test this hypothesis examining 100 listed banks in Europe between 2005 and 2014. Our sample is limited to 100 banks as it is a challenging task to obtain European bank board information due to varying data availability across different countries. Effective governance mechanisms are critical to maintaining confidence in the banking sector, which are vital to the functioning of the financial system and the economy (Leventis et al., 2013). It is particularly important to understand how certain board structures could curb bank risk-taking because of the opaqueness and the prevalence of greater information asymmetries in banking.

Our contribution to the literature is twofold. First, we provide initial empirical evidence presenting the impact of chair-CEO age dissimilarity on bank risk-taking. Literature examining the impact of age diversity on bank risk-taking is scant. Only Talavera et al. (2018) examines the

association between board age diversity and bank risk-taking in China and find no relationship. Our study is different because our measure of age diversity is specifically based on the age difference between the chair and the CEO, two key roles on the board. We also examine how a larger chair-CEO age difference, namely a generational gap, may influence bank risk-taking behaviour.

Second, we contribute to the limited literature on the role of corporate governance mechanisms in alleviating European banks' excessive risk-taking behaviour. Empirical studies, especially examining cross-country data, is sparse. In the aftermath of the 2007-2009 financial crisis' policy makers have increased regulatory requirements with a focus on pre-crisis corporate governance failings. In particular, the EU's Capital Requirements Directive (CRD) IV has been introduced to not only boost capital and liquidity requirements but also to re-shape the composition and functioning of bank boards in order to prevent excessive risk-taking. CRD IV stresses the importance of board diversity and separation of the chair and the CEO. Our analysis is linked to the aforementioned developments as it provides evidence on chair-CEO diversity and its impact on the risk-taking behaviour of European banks.

We find that chair-CEO age difference reduces bank risk-taking behaviour. In particular, a chair-CEO generational gap – defined as a minimum of 20 years of age difference – is highly significant in reducing risks. We use multiple proxies of bank riskiness to distinguish between loan portfolio, insolvency and market-based risk. Our analysis controls for other chair-CEO dissimilarities, such as gender and prior industry experience, as well as other chair, CEO, board, bank and macroeconomic characteristics. We do not find chair-CEO differences in gender or prior industry experience have an effect on bank riskiness. As our results may be prone to various endogeneity issues often highlighted in the corporate governance literature, we use a battery of alternative estimators and specifications to check for robustness.

The remainder of the paper is organised as follows. In Section 2 we, firstly, review the existing literature on the impact of board attributes and diversity on bank risk-taking. Subsequently, we develop hypotheses based on organisational theories of social connections and diversity. In Section 3 we present the data and methodology. Results are presented in Section 4 and in Section 5 we provide tests for robustness. Section 6 concludes.

## **2. Literature review and hypothesis development**

### **2.1. Board attributes, board diversity and bank risk-taking**

There is an increasing literature examining the impact of various board attributes on bank risk-

taking. One key attribute is board size.<sup>3</sup> Larger boards with more human capital may have a potential to better supervise managers to reduce risk-taking behaviour. In contrast, decision-making may be problematic due to coordination and control problems in large boards, where a risk-taker CEO may take more control. Empirical evidence on this relationship is mixed. During the 2007-2009 financial crisis period banks with larger boards were found to be riskier (Pathan, 2009; Fortin et al., 2010; Adams, 2012; Peni & Vähämaa, 2012; Beltratti & Stulz, 2012; Wang & Hsu, 2013; Battaglia and Gallo, 2016). In contrast, studies examining pre-crisis periods generally find a negative relationship between board size and bank risk-taking (Akhigbe & Martin, 2008; Erkens et al., 2012; Faleye & Krishnan, 2015).<sup>4</sup> Another main attribute is board's shareholder friendliness – providing stronger protection of shareholders' interests and superior alignment of managers' interest with those of shareholders. Banks with shareholder friendly boards are found to have performed significantly worse during the crisis (Aebi et al., 2012; Erkens et al., 2012; Peni & Vahamaa, 2012) and taken on more risk (Beltratti & Stulz, 2012; Anginer et al., 2018). Literature often ties these findings to the tendency of bank shareholders to take-on more risk at the expense of depositors and other stakeholders.

Bank-risk taking may be affected by board diversity including gender, competence, independence, and age. The empirical evidence on the impact of gender on risk-taking is inconclusive.<sup>5</sup> Berger et al. (2014) find that banks have higher loan portfolio risk when there is a higher representation of female executive members on the board. In contrast, Muller-Kahle and Lewellyn (2011) show that banks with gender diversity were less likely to engage in subprime lending in the pre-crisis period. Board competence rooted from experience, expertise and education may have a significant effect on bank risk-taking incentives (Srivastav & Hagendorff, 2016). For example, advisory and monitoring roles of the board on manager risk-taking may depend on the expertise and experience of directors (Hau & Thum, 2009; Ellul & Yerramilli, 2013; Jermiasa & Gani, 2014). Boards with financial knowledge and expertise can distinguish risks that will not pay off (Minton et al., 2014). Evidence shows that loan portfolio risk is lower when more board members have doctorate degrees (Berger et al., 2014) and banks suffer larger losses if the board lacks financial expertise (Hau & Thum, 2009). In contrast, there is also evidence that board financial expertise leads to higher risk-taking (Minton et al., 2014; IMF, 2014). These authors explain that expertise avails board members to appraise risky policies that may favour shareholders.

Busy directors are also suggested to influence firm outcomes. Theoretical arguments posit

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<sup>3</sup> Impact of board size on bank profitability is widely researched. While some studies find that larger boards increase bank performance (Adam & Mehran, 2012; Aebi et al., 2012; García-Meca et al., 2015), others find a negative relationship (Wang et al., 2012; Pathan & Paff, 2013; Liang et al., 2013) or no relationship (Minton et al., 2014).

<sup>4</sup> An exception is Wang and Hsu (2013).

<sup>5</sup> In terms of bank performance, some studies find a positive effect of the presence of woman on boards (Pathan & Faff, 2013; García-Meca et al., 2015) while others argue that gender does not matter (Nguyen et al., 2015).

that multiple directorships signals director's abilities and quality (Fama and Jensen, 1983) as well as their incapacity in monitoring and advising due to time limitations arising from multiple roles (Adams et al., 2010). There is empirical evidence supporting both of these arguments. For example, banks with busy directors are more likely to engage in subprime lending (Muller-Kahle & Lewellyn, 2011). In contrast, US bank holding companies with busier directors are found to be less risky (Elyasiani & Zhang, 2015). Other studies report no significant relationship between busy directors and bank risk-taking (Grove et al., 2011; Aebi et al., 2012). Independent directors are also widely considered to be more effective monitors as they have reputational concerns and have fewer conflicts of interest with insider managers (Fama & Jensen, 1983). However, evidence on the link between independent directors and bank risk-taking is inconclusive.<sup>6</sup> Some studies suggest that a larger number of independent directors leads to greater risk-taking (Beltratti & Stulz, 2012; Minton et al., 2014). Others argue the opposite (Ellul & Yerramilli, 2013; IMF, 2014) or find no significant relationship (Erkens et al., 2012).

Age is another important demographic as it can continuously affect an individual's attitude, investment behaviour, decision-making and information processing (Taylor, 1975; Rhodes, 1983; Yim, 2013; Serfling, 2014). Empirical evidence suggests that individual's risk-taking behaviour decreases as they get older. For example, older individual are less likely to invest in equity investments (Campbell, 2001) as their risk tolerance declines (Sahm, 2007; Grable et al., 2009; Bucciol & Miniaci, 2011). A plausible explanation for this is that individuals' tendency to attain knowledge of risk and risky situations over their lifetime (Grable et al., 2009) and younger individuals tend to have lesser experience and therefore tend to make more mistakes in financial decision-making (Agarwal et al., 2009). Survey evidence also show that older executives are likely to take less risk (MacCrimmon & Wehrung, 1990). Related to our paper, the literature examining the link between board age and bank risk-taking is limited. A rare example is Berger et al. (2014) who finds that banks with a larger number of younger executives have higher portfolio risks. This may be because younger managers are more likely to be incentivised to boost returns in order to increase their job security and, therefore, engage in risky activity (Grove et al., 2011). In contrast, Talavera et al. (2018) find no significant relationship between board age diversity and bank-risk taking in China.

## **2.2. Social connections, demographic similarities and firm economic outcomes**

In the corporate governance literature board directors are widely classified as *independent* if they do not have any business links with other members of the board. However, this conventional

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<sup>6</sup> Literature also investigates the link between board independence and bank performance. Liang et al. (2013) and García-Meca et al. (2015) find that a higher percentage of independent directors leads to better bank performance, while Wang et al. (2012) and Pathan and Faff (2013) report a negative relationship. Adams and Mehran (2012) find no relationship between the two.

criterion for board independence might not reflect the potential impact of *board social independence*, where board directors share informal social connections with each other, on firm economic outcomes (Hwang & Kim, 2009; Goergen et al., 2015). It is argued that informal social connections amongst board members are not in the best interest of shareholders as it may destroy independence and monitoring capacity (Fracassi & Tate, 2012).

Development of social connections are closely related to the management and sociological theories of *upper echelons* and *homophily*. *Upper echelons* theory suggests that executives' demographics substantially influence their understanding of various management situations and affects their decision-making (Hambrick & Mason, 1984). Demographic diversity influences group processes. It has a negative effect on group cohesion (Lott & Lott, 1961; Katz, 1982; O'Reilly et al., 1989) and the frequency of group communications (Wagner et al., 1984; Smith et al., 1994), and may lead to increased conflict (Wagner et al., 1984; Eisenhardt & Schoonhoven, 1990). The theory of *homophily* conjectures that a higher frequency of interactions build more personal and social connections between individuals who have similar demographic attributes (Marsden, 1987; McPherson et al., 2001; Dumas et al., 2013).<sup>7</sup> Pfeffer (1983) establishes the link between demography and dimensions of management control. They argue that socialisation, or informal control, will be most effective when members are more homogeneous due to their similarity of background, joint experience, and shared perspective, which provide a common vocabulary and the basis for mutual understanding. In contrast, impersonal, bureaucratic controls will be observed when there is demographic diversity. Murray (1989) argues that heterogeneous teams may decrease performance in stable environments as the team would require more formal interaction and be less cohesive. In contrast, heterogeneous groups are preferable in changing environments as they facilitate adaptation (Murray, 1989).

Social ties between board directors and the CEO may undermine board monitoring effectiveness. For example, in comparison to only conventionally independent boards, conventionally and socially independent boards are found to award significantly lower levels of compensation, exhibit stronger pay-performance sensitivity, and stronger turnover-performance sensitivity (Hwang & Kim, 2009). Firms have been found to have lower valuations and operating profitability if CEOs have more social ties with directors (Lee et al., 2014). Additionally, in such firms, CEOs engage in more value-destroying acquisitions (Fracassi & Tate, 2012) and internal agency conflicts increases (Lee et al., 2014). It is argued that difference in age between the chair and the CEO limits the formation of social ties and this boosts cognitive conflicts leading to greater

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<sup>7</sup> For example, Dumas et al. (2013) empirically examines how racial dissimilarity may effect information social connections. They conclude that even though co-workers may engage in social activities voluntarily, due demographic dissimilarities, these may not lead to closer relationships.

monitoring intensity of the board and increased firm value (Goergen et al., 2015). Studies examining the impact of board social ties on banking outcomes are extremely limited. One rare study is by Berger et al. (2013) who show that greater social ties increase the probability of an outside candidate's appointment to bank boards.

### **2.3. Chair-CEO age dissimilarity**

Overall, following the above evidence, one would expect to have higher *board social dependence* if members have similar demographics and backgrounds. As mentioned in Section 2.1, there is a dearth of literature in banking research on the impact of demographic dissimilarities and risk-taking. Extending the demographic dissimilarity research to a banking setting, in this paper, we examine whether demographic dissimilarities between two key board members, the chair and the CEO, effect bank risk-taking behaviour.

The key demographic dissimilarity we utilise is age. Our justification is twofold. Firstly, age is a significant factor that can continuously affect an individual's attitude, investment behaviour, decision-making and information processing (Taylor, 1975; Rhodes, 1983; Chevalier & Ellison, 1999; Hong et al., 2000; Bucciol & Miniaci, 2011; Yim, 2013; Serfling, 2014). Secondly, and more importantly, in the corporate governance process directors from the same generation, sharing similar historical events and social trends, are mentally connected and similarly minded (Wagner et al., 1984; Bantel & Jackson, 1989; Harrison et al., 1998; Pelled et al., 1999).<sup>8</sup> Chair-CEO age similarity may be an important indicator of the strength of social ties between the chair and the CEO. However, age similarity may have a negative impact on the efficiency of bank corporate governance as, due to stronger social connections, cognitive conflict is less likely between the chair and the CEO. On the other hand, a greater chair-CEO age dissimilarity leading to more cognitive conflicts will strengthen the board's monitoring ability (Adams & Ferreira, 2007; Goergen et al., 2015). We argue that difference in age between the chair and the CEO will increase cognitive conflicts leading to better monitoring and control of excessive risk-taking behaviour. Hence we test the following general hypotheses:

**H1.** *Age dissimilarity between the chair and the CEO will curb bank risk-taking behaviour.*

More specifically, we are interested in a larger difference in age between the CEO and the chair. As Goergen et al. (2015) argues, fewer social ties leading to cognitive conflict between the chair and the CEO are more likely to exist if they are from different generations. Hence we test the following more specific hypothesis:

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<sup>8</sup> Research also finds that age similarity impacts on group processes, communication and cohesion (Rhodes, 1983; Mehra et al., 1998; Zenger & Lawrence, 1989).

**H2.** *A generational difference in age between the chair and the CEO will curb bank risk-taking behaviour.*

### **3. Data and methodology**

#### **3.1. Sample**

Our novel dataset covers 100 banks publicly listed banks from 16 European countries<sup>9</sup> over the period of 2005-2014. The sample includes commercial banks, bank holding companies and savings banks. We collate the data from a number of sources. Most of the board characteristics are hand collected from annual reports, BoardEX, Bloomberg and banks' websites. Bank financial data is collected from Bankfocus and Datastream. Our final dataset includes 807 bank-year observations.<sup>10</sup> It is worth noting that collecting data for more banks is problematic due to the non-uniform disclosure requirements of banks' board information in Europe. This is a limitation and a challenge for corporate governance research in European banking. Our data is unbalanced and in some cases some variables are missing; hence, the number of bank-year observations vary between 502 and 572 in our main estimations presented below.

#### **3.2. Bank risk-taking proxies**

We use multiple proxies of bank riskiness to distinguish between loan portfolio risk, insolvency risk and market-based risk. We use two indicators, the ratio of *loan-loss reserves to gross loans* and the ratio of *impaired loans to gross loans*, which are commonly used in the literature to measure loan portfolio risk.<sup>11</sup> *Loan-loss reserves to gross loans* include bank managers' evaluation of the loan portfolio quality, including non-performing and performing loans. This ratio accounts for the loan portfolio's past performance as well as the expectation for its' future performance (Abedifar et al., 2013).<sup>12</sup> *Impaired loans to gross loans* is a backward-looking proxy for credit risk and shows the level of credit risk ex-post.

We use *Z-score*, which measures the distance from insolvency, as an indicator for bank insolvency risk. *Z-score* equals the average return on assets plus the average capital asset ratio divided by the standard deviation of asset returns. Insolvency is defined as a state in which losses surmount equity (Laeven & Levine, 2009). Following the literature (see for example Laeven & Levine, 2009; Delis & Kouretas, 2011; Gropp, et al., 2011), we define the inverse of the probability

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<sup>9</sup> These countries are Austria, Belgium, Denmark, Germany, Finland, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, Switzerland and UK. In Appendix B we present the distribution of banks per country in our sample.

<sup>10</sup> It is worth noting that in some cases we observe that the chair and the CEO are the same person (i.e. CEO duality). These constitute 9.5% percent (77 observations) of all of the 807 observations. However, none of the banks have CEO duality for all the periods we are observing.

<sup>11</sup> See for instance, Angbazo (1997), Kwan and Eisenbeis (1997), Shiers (2002), Konishi and Yasuda (2004), Cebenoyan and Strahan (2004), Gonzalez (2005), Altunbas et al. (2007), Lepetit et al. (2008) and Abedifar et al. (2013).

<sup>12</sup> One of the potential problems of using loan-loss reserves as a measure of bank risk-taking is that the magnitude of loan-loss reserves is affected in part by practice with regard to charge-offs, which could vary across regulatory regimes or as a result of the exercise of management discretion. For example, Liu and Ryan (2006) show that banks smooth their income in the medium term by managing their income downward when they are profitable via accelerating provisions for losses.

of insolvency as the *Z-score* and a higher value indicates that the bank is less risky. *Z-score* is related to the banks' past investment decisions. Hence, it encompasses the current bank risk-taking behaviour as well as the risk accumulated over time (Drakos et al., 2016).

We use *Equity risk* which measures the volatility of banks' stock price (Anderson & Fraser, 2000; Pathan, 2009; Peni & Vähämaa, 2012; Minton et al., 2014). This indicator is the standard deviation of bank's daily stock price of the current year ( $t$ ) and the following year ( $t + 1$ ). Stock price is adjusted for any capital adjustments including dividend payments and stock splits. *Equity risk* captures the overall variability in bank stock returns and reflects the market's perceptions about the risks inherent in the bank's assets, liabilities, and off-balance-sheet positions (Pathan, 2009).

### 3.3. Measures of age dissimilarity

Following Goergen et al. (2015) we utilise four variables to measure chair-CEO age dissimilarity. *Chair-CEO age difference* equals to the chair's age minus the CEO's age. The difference can be positive or negative indicating that cognitive conflict between the two may arise both in cases when the chair is considerably older or younger than the CEO. *Chair-CEO age difference absolute* is the absolute value of *Chair-CEO age difference*. This variable captures age dissimilarity between the two regardless of whoever is older. We also employ *Chair-CEO age difference squared* to capture any non-linear relationship between age difference and bank risk-taking. Goergen et al. (2015) argue that cognitive conflict between the CEO and the chair is likely to be strongest if they is a generational age difference between the two. A generational gap is defined as an age difference of at least two decades (Strauss & Howe, 1997). To capture the chair-CEO generational gap, we use *Chair-CEO age gap 20*, which equals to 1 if the chair-CEO absolute age difference is larger than or equal to 20 years, and 0 otherwise.

We also utilise a set of variables that measure other chair-CEO dissimilarities. To proxy for gender differences, we use *Chair-CEO gender difference*, which equals to 1 if the chair and the CEO are different gender, and 0 otherwise. We use *Chair-CEO industry experience difference* to proxy the differences in the industrial experience between the chair and the CEO. This variable equals to 1 if the chair and CEO are from different industry backgrounds, and 0 otherwise.

### 3.4. Measures of board, CEO and chair characteristics

We use a set of variables that are common in the corporate governance literature to measure board characteristics.<sup>13</sup> *Board size* is the number of directors on the board. *Board independence* is the percentage of independent directors. *Busy board* is a dummy variable that identifies whether more than 50% of board directors hold more than one director role in other companies, and 0 otherwise.

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<sup>13</sup> See for instance Fich and Shivdasani (2006), Fortin et al. (2010), Minton et al. (2010), Adams (2012), Peni and Vähämaa (2012), Field et al. (2013) and Elyasiani and Zhang (2015).

Following the literature, we measure CEO power by *CEO tenure* and *CEO retirement* (Adams et al., 2005; Pathan, 2009; Kaplan et al., 2012; Onali et al., 2015). *CEO tenure* equals to the number of years the CEO has been employed as the CEO of the bank. *CEO retirement* is a dummy variable taking the value of 1 if the CEO's age is over 60, and 0 otherwise. We use *Chair tenure* to capture chair power, which equals to the number of years the chair has been serving on the board. *Ex-CEO* equals to 1 if the chair is the former CEO of the bank, and 0 otherwise (Andres, 2014). *Busy chair* equals to 1 if the chair takes more than one boardship in other firms, and 0 otherwise. *CEO change* is a dummy variable that equals 1 if the CEO is changed during the period of observation, and 0 otherwise. Similarly, *Chair change* captures the change of the chair. We use the *Chair-CEO joint tenure*, which is the number of years that the chair and the CEO have been working together, to reflect the interaction between the chair and the CEO. We also control for *Younger chair*, which equals 1 if the chair is younger than the CEO, and 0 otherwise.

Prior studies suggest that bank size, capital and activity have an impact on profitability and risk-taking.<sup>14</sup> To control for these factors we use bank characteristics. Bank size is measured as the natural logarithm of the *Total assets* of the bank. *Total capital ratio* is the total of Tier 1 and Tier 2 capital as a percentage of total assets. Bank activity is measured with the yearly *Growth of total gross loan*. We also use *GDP growth*, *Public debt* (percentage of GDP) and *Year* dummy variables to control for the macroeconomic environment. *GDP growth* is utilised to capture the macroeconomic environment within the specific country, especially the business cycle.<sup>15</sup> *Public debt* is a broader macro variable that captures the availability of other forms of financing and controls for additional sources of debt apart from bank financing, such as the bond markets, in the specific country. We utilise a *Financial crisis dummy*, which equals 1 for the time-period of 2007-2009 and 0 otherwise, accounting for the 2007-2009 global financial crisis period.

### 3.5. Empirical model

Following earlier literature (Laeven & Levine, 2009; Berger et al., 2014; Minton et al., 2014; Elyasiani & Zhang, 2015) we model bank  $i$  ( $i = 1, 2, \dots, 100$ ) at time  $t$  ( $t = 2005, 2011, \dots, 2014$ ) as a function of the factors explained above and estimate the following model:

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<sup>14</sup> See for instance Laeven and Levine (2009), Demirgüç-Kunt and Huizinga (2010), Adams and Mehran (2012), Berger and Bouwman (2013) and Bennett et al. (2015).

<sup>15</sup> It is argued that bank lending standards are influenced by macroeconomic conditions and banks soften their credit standards during booms, which may signal more risk-taking (see for instance Jimenez et al., 2018).

$$\begin{aligned}
\text{Bank risk taking}_{i,t} = & \beta_0 + \beta_1 \text{ChairCEO age dissimilarity}_{i,t} + \beta_2 \text{ChairCEO gender dissimilarity}_{i,t} \\
& + \beta_3 \text{ChairCEO industrial experience dissimilarity}_{i,t} \\
& + \sum_{j=1}^J \beta_j \times \text{Chair characteristics}_{j,i,t} + \sum_{h=1}^H \beta_h \times \text{CEO characteristics}_{h,i,t} \\
& + \sum_{s=1}^{S-1} \beta_s \times \text{Board characteristics}_{s,i,t} + \sum_{k=1}^{K-1} \beta_k \times \text{Bank characteristics}_{k,i,t} \\
& + \sum_{l=1}^{L-1} \beta_l \times \text{Macro indicators}_{l,i} + \sum_{y=1}^{Y-1} \beta_y \times \text{Year}_{i,y} + \mu_i + e_{i,t}
\end{aligned}$$

Where:

*Loan-loss provisions to total loans*, *Impaired loans to total loans*, *Equity risk* and *Z-score* are used interchangeably as bank risk-taking variables,  $\mu$  denotes the fixed effect of bank  $i$  and  $e$  denotes the remaining disturbance term. We use fixed effects as the main estimator. Bank fixed effects helps to control for unobserved heterogeneity that is constant over time. Our assumption is that individual bank-specific effects that do not vary over time (such as the type of bank) may be correlated with the independent variables measuring risk-taking. We also use yearly fixed effects to capture the effect of aggregate macroeconomic trends and pick-up any variation in risk-taking that happens over time but is not attributed to our independent variables. All regressions are based on unbalanced panel data due to missing observations, especially in the earlier sample periods.

### 3.6. Descriptive statistics

Descriptive statistics for all variables are presented in Table 1. Panel A reports the bank risk measures. Mean *Z-score* is 45.6 while mean *Equity risk* is 26.2. Averages for *Loan-loss reserves to gross loans* and *Impaired loans to gross loans* are 3.3% and 5.3%, respectively. Panel B presents descriptive statistics for various chair-CEO characteristics. The average age difference between the chair and the CEO is 7.8 years. The average of the absolute differences for this variable is 10.0 years. We observe at least 20 years of age difference between the two for 13% of all banks in the data. We find that there is a gender dissimilarity between the CEO and the chair for 3% of all observations. The chair and the CEO have different industry experience in 31% of observations. Panel C reports descriptive statistics for chair and CEO characteristics. The average CEO tenure is 6.0 years while a slightly shorter period of 5.6 is observed for the chair tenure. Chairs are busy for 70% of all observations. Panel D reports descriptive statistics for board characteristics. Mean board size is 15. Independent directors, on average, constitute 63% of the board. Boards where at least 50% of directors hold more than one directorship with other firms constitutes 89% of all observations. In Panel E, we present statistics for bank characteristics and macroeconomic

indicators. Mean bank size is \$416 billion U.S. dollars indicating that the sample comprises mainly the largest banks in Europe. Average bank capital ratio and growth in the gross loans are 15.7% and 9.7%, respectively. Finally, in Panel F we report descriptive statistics on age difference variables by bank size. Banks are grouped into two as large and small based on mean total assets of all observations in the sample. Banks are defined to be large (small) if their total assets are above (below) the mean value. For our key variables, *Chair-CEO age gap 20* and *Chair-CEO age difference*, we do not observe a significant difference. In fact, in both of the groups we observe a 20-year age gap between the chair and CEO in 13% of all observations. Chair-CEO age difference is 7.9 and 7.5 years in large and small banks, respectively.

[Insert Table 1 about here]

## 4. Regressions Results

### 4.1. Results for chair-CEO age difference

We present the results of the fixed effect estimations to test the relationship between chair-CEO age difference and bank risk-taking in Tables 2 to 5. In all specifications, we include all the control variables as well as bank- and year-fixed effects. Table 2 presents results for the loan portfolio risk variable *Loan-loss reserves to total gross loans*. In Columns 1 to 4 we employ each of the four age difference variables separately without those for gender and prior industry experience. These latter variables are introduced in Columns 4 to 8. We find that the coefficient of *Chair-CEO age gap 20* is statistically significant at the 10% level and has a negative sign (Columns 1 and 4). *Chair-CEO age difference* is significant in Column 2 with a negative effect on bank risk-taking. Similarly, *Chair-CEO age difference absolute* is statistically significant at 5% level and has a negative sign in Columns 3 and 7.

[Insert Table 2 about here]

In Table 3 we report the estimation results for the *Impaired loans to gross loans*. Out of the four chair-CEO age dissimilarity variables, we find the coefficient of *Chair-CEO age gap 20* and *Chair-CEO age difference* to be significant and having an adverse impact on *Impaired loan to gross loans* ratio. These results exhibit that there is some alleviating impact of chair-CEO age difference on banks' loan portfolio risks. Results on current and expected credit risk, *Loan-loss reserves to total gross loans*, and past credit risk, *Impaired loan to gross loans*, indicators are complementary and show the consistency of the relationship between the chair-CEO generational gap and loan portfolio risks.

Results for the broader bank risk measure reflecting market perceptions, *Equity risk*, are presented in Table 4. We report negative and statistically significant coefficient for the *Chair-CEO*

*age gap 20* at 10% and 5% levels in Columns 1 and 4, respectively. *Chair-CEO age difference absolute* also carries a negative sign and has a stronger statistical significance at the 1% level both in Columns 3 and 7.

Results for the *Z-score*, also a broader risk measure capturing distance to default, are presented in Table 5. We find *Chair-CEO age gap 20* to be statistically significant at the 5% level with a negative sign in Columns 1 and 5. We do not find other age difference variables to be significant. This shows that only a generational age difference between the CEO and the chair leads to a lower default risk in banks.

[Insert Tables 3, 4 and 5 about here]

Overall, our results show that chair-CEO age difference is negatively related to various bank risk-taking measures. This is consistent both in loan portfolio risk as well as in broader bank risk-taking measures. More importantly, we consistently find that a generational age gap between the chair and the CEO is associated with lower levels of bank risks. This result is in-line with our hypothesis that a cognitive conflict, which may be caused by larger differences in age, leads to more independent and prudent monitoring of risk-taking activities, which in-turn reduces overall bank risks.<sup>16</sup>

#### **4.2. Gender and industrial experience dissimilarity**

Our results do not show significant results for gender and industrial experience differences for any of the bank risk measures reported in Tables 2 to 5. The only exception is the weakly significant negative coefficient of *Chair-CEO different industry experience* in Table 3. This result suggests that there may be a remedying effect of different industrial experience between the chair and the CEO on loan portfolio risks. Regarding gender differences, the literature suggests that this can impact firm outcomes (Carter et al., 2003; Adams & Ferreira, 2009; Gupta & Raman, 2013); however, we find no such results for bank risk-taking.

#### **4.3. Significance of control variables**

We report insignificant coefficients for a large number of variables for all the estimations. In other words, many chair, CEO and board characteristics do not seem to have an impact on bank risk-taking behaviour. This is similar to many studies in the area of corporate governance in banking as well as for non-financial companies (see for example Goergen et al., 2015). Nevertheless, we find some significant results. In estimations where we look at loan portfolio credit risk in Table 2, we

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<sup>16</sup> We also run alternative regressions for robustness checks by estimating our baseline models excluding the crisis period (2007 & 2008), where the risk levels of banks increased unusually. We find that our results broadly hold for all of the risk-taking measures and, therefore are robust to possible effects of the crisis period. Results are available upon request.

find that both *Busy Chair* and *Busy Board* are positively related to risk-taking. These findings signal that if the chair and board members take external roles in other companies, they are less likely to monitor the credit risk decisions of the board. We also find similar results for *Busy Board* in Table 3. In Table 4, where we employ *Equity risk*, we have weak evidence that change in the CEO is perceived to be risky by market participants. In Table 5, we find some weak evidence (coefficients are only significant at the 10% level) that *CEO retirement* and *CEO tenure* increases the default probability, *Z-score*, of the bank. On the other hand, banks with younger CEOs are found to have lower default probability. We also find that the coefficient of *Busy Board* is significant in some models, albeit weakly, and negative in most of the models in Table 5. This finding may provide some (cautious) evidence that busy outside directors on boards can contribute to managing the overall risk of the bank and reduce default probability, a result in-line with Elyasiani and Zhang (2015). Boards with a larger portion of busy outside directors are also expected to have better board capital by having enhanced financial skills, connections, and industry knowledge.

## **5. Potential endogeneity concerns and robustness checks**

As highlighted in the corporate governance literature, our results may be prone to various endogeneity issues. They may be influenced by dynamic endogeneity, where past realisations of the dependent variable influences current realisations of one or more of the explanatory variables (Wintoki et al., 2012). For example, the present board structure may be a result of previous performance and, in turn, is likely to impact on future outcomes.

In our setting, past bad management of bank risks could cause a change in current board structure or a replacement of the chair or the CEO. This, in-turn, may have an impact on the age difference between the CEO and the chair. Hermalin and Weisbach (2003) argue that governance mechanisms are determined endogenously, therefore, the direct relationship between any board characteristic and firm outcomes may be spurious. In this context, *CEO power* or *CEO duality* may also influence the future board structure and performance generating endogeneity issues. For example, Shivdasani and Yermack (1999) find that CEOs frequently play a major role in the nomination process of the board. Hermalin and Weisbach (1998) show how CEO power arises endogenously as a result of delivered performance. It is worth noting that CEO duality is less likely to have an impact on our results as we exclude observations where the CEO and the chairman are the same person. Another type of endogeneity may be brought about by omitted bank level variables. This type of endogeneity is accounted for by employing bank fixed-effects in our regressions, which control for bank characteristics (such as culture, image, being conservative or the type of bank) that may be omitted in the model. However, we further estimate a two-step system GMM in order to reduce the possible effects of dynamic endogeneity and omitted variable bias in

our results (Arellano and Bond, 1991). Blundell and Bond (1998) suggest that the systems GMM corrects for both types of endogeneity. Results of GMM regressions are presented in Table 6. We only present results for our main findings in our original models presented above in Tables 2 to 5. We find that our main age gap variable, *Chair-CEO age gap 20*, is still statistically significant and has a negative impact on bank risks relating to loan portfolio risks, reported in Columns 1 and 3, as well as *Z-score*, in Column 6. We also find that *Chair-CEO age difference absolute* still has a negative and significant effect on bank portfolio risk (Column 2) and equity risk (Column 5). *Chair-CEO age difference* is also significant (albeit at the 5% level) in Column 4 and has a negative sign. Hence, we can confirm that our results are not prone to serious dynamic endogeneity and omitted variable bias issues.

[Insert Table 6 about here]

In our setting, another type of endogeneity issue could arise from unobserved heterogeneity of chair-CEO age similarity. Similar to Goergen et al. (2015), some attributes of the CEO or the chair, such as prior industry and management experience, may be correlated with chair-CEO age difference variables. If this is the case, then our estimations would be spurious. Even though we control for various chair and CEO characteristics, we do not completely adjust for skill or experience and other possible time-invariant heterogeneity. Following Goergen et al. (2015), to deal with endogenous matching and unobserved heterogeneity, we use chair-firm fixed effects and re-run our estimations for each of the bank risk indicators. We present results for selected models in Table 7. We find that in all models both the *Chair-CEO age gap 20* and *Chair-CEO age difference* variables have a statistically significant inverse impact on risk-taking. This test shows that serious unobserved heterogeneity or endogenous matching problems are unlikely to have an effect on our results.

[Insert Table 7 about here]

We also use an instrumental variable (IV) GMM estimator as an alternative method to address the potential endogeneity bias. However, it is problematic to find variables that can serve as valid instruments in our setting for chair-CEO age difference as the relevant theory is scant. We use two approaches. First, motivated by previous literature (Hwang & Kim, 2009; Pathan, 2009; Miletkov et al., 2014), we use lagged chair-CEO dissimilarities and corporate governance variables as instruments for the first-stage estimating the chair-CEO age difference variables. Results are presented in Table 8. Overall, the coefficients of the instrumented chair-CEO age difference variables on bank risk-taking are in-line with our initial findings. Second, following the literature (Laeven & Levine, 2009; Aggarwal et al., 2010; Anginer et al., 2014; Safiullah & Shamsuddin,

2018), we use the year-average of age difference variables from other peer banks in the same country as an instrument for the relevant bank when estimating the chair-CEO age difference variables in the first-stage. We believe that this is a reasonable instrument because a change in the risk-taking behaviour of one bank is less likely to influence chair-CEO age differences of other banks. Results are presented in Table 9. We observe that our main findings hold also in this specification. To check the validity and relevance conditions of the instrumental variables, we use the Kleibergen-Paap (Cragg-Donald) F-statistic to address the weak identification issues. The results of the F-statistic are larger than the Stock-Yogo's critical values (Stock et al., 2002) in all estimations, which indicates that the instruments used in the first stage regressions are not weak or under-identified. The Hansen J statistic is also significant showing that the instrumental variables are not over-identified. Hence, our instrumental variables satisfy validity and relevancy conditions.

[Insert Tables 8 and 9 about here]

Another issue within our setting could be low time-series variation. Andres (2008) argues that fixed effects models require longitudinal variation in the data. However, if only a few banks change their chairs and CEOs we may not observe enough variation within the sample, which makes fixed effects estimations insufficient for identification. We believe that our dataset provides sufficient time-series variation that is required for parameter identification. Specifically, during the 10-year period we examine, both chair and CEO change constitutes 12% of the observations. Nevertheless, we also use random effects regressions as an alternative to bank-fixed effects, as another way to deal with the potential low time-series variation. Results for random effects are presented in Table 10. We find that the coefficients of *Chair-CEO age difference* variables are still significant in all of our models.

[Insert Table 10 about here]

## 6. Conclusion

The widespread failure of financial institutions in the 2007-2009 crises brought to light concerns regarding the corporate governance of banks. A vital component of bank governance is the role of the board of directors who are primarily responsible to owners for overseeing and monitoring bank risk-taking. It is argued that diversity, creating cognitive conflicts, is expected to enhance board's independence of thought to better perform its monitoring and advising functions. In this context, the relationship between the chair and the CEO, two key figures on the board, and their interaction can have a significant influence on board decisions and, in a banking context, their risk-taking behaviour. In particular, age differences can cause cognitive conflicts which may be beneficial for controlling and reducing risk-taking. In this paper we investigate whether chair-CEO age

differences influence bank risk-taking using information from a sample of 100 publicly listed European banks over the period 2005-2014.

We find that chair-CEO age difference reduces bank risk-taking behaviour. In particular, a chair-CEO generational age difference – defined as a minimum of 20 years – is highly significant in reducing risks. We use multiple proxies of bank riskiness to distinguish between loan portfolio risk, insolvency risk and market-based risk. We control for gender and prior industry experience of board members as well as other chair, CEO, board, bank and macroeconomic characteristics. We do not find differences in gender or prior industry experience to have an effect on bank risk-taking. We use a battery of alternative estimators and specifications to check for robustness of our results, especially for various endogeneity concerns. Our main results remain consistent.

Our study has several potential limitations. Firstly, while care has been taken to mitigate endogeneity problems as explained above, the effectiveness of these approaches is still open to debate. Secondly, our sample comprises relatively large listed banks; however, board structures might differ for non-listed or relatively smaller banks. Thirdly, due to data limitation issues, we are not able to control for ownership, particularly concentrated ownership and managerial ownership. Despite these potential limitations, this study demonstrates the importance of age diversity within the board and particularly between the chair and the CEO on bank risk-taking behaviour. Perhaps future studies could shed more light into these issues utilising a larger sample of listed as well as non-listed banks including smaller institutions.

Our study has policy implications for the regulation of the governance of banks particularly linked to the EU's CRD IV pertaining to board diversity. Our results on the effect of age dissimilarity between the chair and CEO on bank-risk taking support the aforementioned directive in recommending greater board diversity (in particular relating to chair-CEO age difference) as this can mitigate excessive bank risk taking behaviour. Our evidence at the European cross-country level is also relevant to policy makers in other economic regions and countries. Additionally, our banking sector findings are in-line with Goergen et al. (2015) who found similar conclusions for German non-financial companies. Hence, the positive effect of age dissimilarity may be relevant in other sectors and countries, where policy makers and investors can consider these influences on firm behaviour.

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