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Banks: from inside to outside

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Declaration

I, Valentina Lagasio, declare that this thesis titled *Banks: from inside to outside*, and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
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Short summary

This research comes from the desire to investigate in depth banking institutions from different angles perspectives: from the inside, exploring their internal characteristics (Corporate Governance as well as business models) and from the outside, by also considering how they are perceived by supervisors and investors.

Therefore, this work is composed by the 3 papers outlined below.

1. The big bank theory: into the bank Corporate Governance literature

Abstract: *"Alongside adequate capital and organization, the third factor of the stability of the banking system is the quality of Corporate Governance"* (Draghi, 2008).

Corporate Governance of banks is not only important it also unique (Levine, 2004). Sound bank Corporate Governance is a crucial element for promoting a more resilient financial system (FSB, 2013) and sustaining economic growth (Basel Committee of Banking Supervision (BCBS), 2015).

A systematic literature review is conducted on a sample of articles published on peer-reviewed academic journals. Balancing theoretical and empirical contributions, findings show that academic research on bank Corporate Governance is mainly focused on risks potentially faced by banks and their performance capabilities.

This paper examines the developments of bank Corporate Governance literature and tries to shed some light on the causality dilemma between theory and practice, by investigating whether or not the progress of regulation and supervision in the area of bank governance follows academic findings or viceversa.

Methodology: systematic literature review, content analysis

Results: the main findings of this paper lead to assert that there is an increasing understanding of the fundamentals of bank Corporate Governance such as board structure, committees, risk management, and ownership structure. This result stands out from both banking and institutional perspective. Indeed, authorities have developed several measures with the aim of strengthening risk management regulation, and assessing the accuracy and usefulness of information provided to and from banks' directors also by engaging more frequently with board and management.

Conclusion: standard setters and regulators tend to focus respectively on what the board should do and must do and the necessary competences of board members as opposed to structural characteristics (Basel Committee on Banking Supervision, 2010; FSB, 2013; Directive 2013/36/EU or CRD IV; Bank of Italy, 2008) (Brogi, 2011).

Nonetheless, there is still a lot of work to do to implement sound Corporate Governance. This paper examines the developments of bank Corporate Governance literature trying to shed some light on the causality dilemma between theory and practice, by investigating whether or not the progress of regulation and supervision in the area of bank governance follows academic findings or viceversa. There is a long term supervisory perspective resulted by the investigation of the literature the purpose of banks' Corporate Governance is less to safeguard shareholders and investors, but to safeguard depositors and other debt holders.

2. Better safe than sorry. Will the single rulebook on bank Corporate Governance prevent excessive risk taking?

Abstract: conventional wisdom leads to assert that good governance may underpin bank performance while bad governance destroys stability/soundness. Moreover, strong externalities on the economy make bank Corporate Governance a fundamental issue. The European Commission pursued a number of initiatives to create a safer and sounder financial sector for the single market and to restore confidence in banks.

This set of rules is intended to build a single rulebook for financial intermediaries in the EU28. It is based on a three-pronged approach: prudential requirements for banks (Capital Requirements Directive/Regulation); prevention and management of bank failures (Bank Recovery and Resolution Directive); deposit insurance (to be completed).

In particular, the Capital Requirements Directive (CRD IV) imposing in addition to stricter capital requirements, introduces new Corporate Governance and remuneration rules. Bank board characteristics are a crucial factors in bank risk-taking (Rachdi et al., 2013), thus the qualitative and quantitative composition of the board imposed by the new regulatory framework is aimed at preventing/curbing excessive risk-taking. This calls for an in-depth investigation of the Corporate Governance composition of European banks after the introduction of the new single rulebook, in order to fully understand if and how it fills the pre-crisis regulatory gaps.

Methodology: factor analysis, multivariate regression analysis

Results: rules come when failures occur.

Banks' safety and soundness are key to financial stability, and the manner in which they conduct their business, therefore, is central to economic health

(BCBS, 2015). As a result, soundness of bank Corporate Governance is a crucial element not only for promoting a more resilient financial system (FSB, 2013) but also for sustaining economic growth (OECD, 2004; 2015).

Moreover, shortcomings in the governance of banks can result in the transmission of problems across the banking system and, if widespread, can destabilize the financial system (Levine, 2004; OECD, 2006; BCBS, 2015, EU, 2013). The recent financial crisis that started in 2007 and plagued the economy until the recent years, can be considered as *"a wake-up call"* and highlighted that insufficient attention was paid to bank governance (Ahrens et al., 2011; Adams and Mehran, 2012). Indeed, both academics and practitioners claim that shortcomings in bank governance may have played a central role in the development of the crisis (Kirkpatrick, 2009; Aguilera and Jackson, 2010; Adams, 2012; Aebi et al., 2012; Al-Sa-eed, 2012; Erkens et al., 2012; EC, 2013). The current Regulation calls for Boards of Directors and Committees that prevent the undertaking of excessive risk by financial institutions.

As a matter of fact, Regulation may impact on financial risk taking by financial intermediaries by way of the decision-making process envisaged in the various possible legal structures set forth by the law (Brogi, 2009).

The literature review preliminarily conducted shows that even though policy makers attribute increasing importance to Corporate Governance, and there is a growing set of rules that are going to be implemented in the next years, there seems to be mixed evidence on the relation between board size and composition and performance in empirical analysis.

We would expect that our results lead us to assess whether or not Corporate Governance needs to be deeply regulated and which are the most relevant Corporate Governance characteristics that may have impact on bank risk.

Conclusion: actually, it seems that Corporate Governance characteristics exert impact on bank risking but governance structures differ systematically

across countries. The well-known rule that there is not a *"one size fits all model"*, should teach that banks Corporate Governance regulations must be tailor-made, toward creating sound incentives for banks stakeholders. Nonetheless, Corporate Governance is not important itself, but to the extent in which it prevents excessive bank risk taking and improves performance.

Moreover, running after the harmonization of national regulations across economies with very different governance structures may have restrictive effect on the scope of the business judgement rule.

3. Are banks finding their feet? Cluster analysis of banks' business model

Abstract: Business Model Assessment (BMA) is on the top of the agenda of regulators. The aim of this paper is to examine the relationship between banks' business models and both viability and sustainability, as intended by the European Banking Authority (EBA) in 2014. Business models are identified with a cluster analysis based on assets and funding structure of banks' balance sheets as well as the income diversification. The sample of analysis is composed by the 30 Euro area banks listed on the Eurostoxx banks index. Policy implications are also commented.

Methodology: cluster analysis, Capital Asset Pricing Model, multivariate regression analysis

Results: a decline in total assets was registered by more than half of sample banks (18) in the period of observation. Almost all, with the exception of Natixis, decreased total assets in the second sub-period (2010-2015). Natixis starting from 2006. The critical year is 2013, in which almost all the banks reduced total assets (except for Alpha bank, BPER, Sabadell) by more than 7.5% on average with a peak of 20.32% of Deutsche Bank. Conversely for Alpha Bank total assets rose by 26.51%.

The drop in total assets reflects the contraction in loans shown by 22 banks out of 30 in the sample (especially by Spanish banks - BBVA, Sabadell, Santander, Bankinter, Caixabank - BNP, Crédit Agricole, Deutsche Bank) in the period 2010-2015, after a rise for all of the banks during 2006-2010.

The two critical years are 2012 and 2013, in which all sample banks except Alpha Bank and Sabadell decreased the amount of loans by an average of 4.95%. Nonetheless, starting from 2014 all of the banks in the sample increased

loans to customers from the previous year.

Conversely, the majority of sample banks (18) increased total securities (inclusive of derivatives) in the period 2010-2015.

Practically all the banks in the sample (except Intesa Sanpaolo and Ubi) considerably expanded their common equity (with an average rise of 150% over the entire period) with 2010 and 2015 being the years of the most relevant increases

Sample banks' profitability, measured by both Return on Assets (ROA) and Return on Equity (ROE), halved during the period, with contractions from 2006 to 2015 for almost all the banks in the sample that is the result of a continued downward trend. For some banks profitability starts to marginally recover in 2014 while for others in 2015.

The decrease of Market To Book ratio over 2006-2015 is the result of (i) a negative variation during the period 2006-2010 for all the banks in the sample (which in turn reflects the average 60% drop of the ratio in 2007); and (ii) a positive variation in 2010-2015 (except for the Spanish banks BBCA, Sabadell and Banco Popular Espanol) that was mostly achieved in 2012 with the ratio starting to decrease again from 2014.

As expected, the most stable aggregates, measured in terms of percentage standard deviation of observations, both across the sample and also over the period are the various capital ratios that reflect regulatory requirements Total capital ratio (30.31%), Tier 1 Ratio (33.33%), CET1 (37.93%) that for all sample banks increased in the period as a result of higher capital ratios imposed by authorities.

Conversely and somewhat surprisingly, other ratios, more directly connected to business models were actually even more stable across banks and over the entire period: Net Interest Income/Total Operating Income (22.14%) and the cost/income ratio (26.39%) the Loans to deposits (30.35%) and Risk weighted assets to total assets (44.31%).

The most profitable banks (measured both in terms of ROA and ROE) in the ten year period vary considerably over time so slicing the model based on profitability would have led to quite different results based on the starting year and the profitability measure used. Conversely, size and price/book ratios are far more stable.

Comparing profitability with risk shows that larger banks in our sample tend to have higher and less volatile profitability. Low volatility is also an ex post measure of sustainability. Sustainable profitability is important for supervisors since it means that the bank has sufficient income-generating capacity to enable it to maintain an adequate capital base via retained earnings.

The division by business models is actually rather constant over time. In our classification we divide sample banks by business models based - investment banks if loans are less than 15% of total assets or securities are more than 60% of total assets, and as commercial banks if loans are more than 60% of total assets or securities are less than 15% of total assets and then, after these criteria are applied, all other banks are classified based on judgment, taking into account the scope of derivatives activities, the relative shares of securities and loans, and the share of trading income in total revenue – based on the values of the two ratios at the start of the period (2006). Though some differences in the three groups emerge (Figure 3.13, 3.14, 3.15 and 3.16) and we find evidence that commercial banks are and are likely to remain less profitable for as long as the ECB official interest rates will remain very low or negative (Brogi et al., 2015), it is striking that the standard deviation for each of the groups is actually higher than for the entire sample. Moreover, practically same breakdown by business model emerges by applying the ratios to all the years in the period. This provides evidence for the fact that business models tend to be viscous over time. The division by geographical area leads to similar, somewhat discouraging, results.

Conclusion: in this paper we slice and dice the results achieved by the Euro areas top 30 listed banks in the period from 2006-2015. The most striking similarities in banks in the sample seem to be actually related to their business model, they have similar cost income ratios and are still all considerably dependent on interest income for their profitability. Comparing the 30 banks which make up the Eurostoxx Index, business models have remained very stable in the period (the major exception being Bankia, that changes the share of loans on total assets from 68% in 2010 to 47% in 2013 – and 53% in 2015 – and the share of total securities on total assets from 19% in 2010 to 39% in 2013 – and 36% in 2015). All banks rely quite significantly on Net Interest Income (almost 2/3 of Total Income) and Loans to Customers are quite viscous.

Despite the progressive decrease in interest rates, sample banks managed to maintain their net interest income margin, while total operating income (inclusive of a more fluctuating non-interest income) dropped. However, operating cost containment enabled to maintain stable cost/income ratios. Lower profitability stemmed mainly from write-downs of loans. Size seems to be as significant as business model in explaining performance (measured both in terms of ROA and ROE). Moreover, based on this analysis larger banks seem to be more profitable and at the same time present lower volatility in their results.

The starting point of a business model analysis is the identification of the more profitable players which are then investigated to assess the key drivers for their profitability. However, our analysis does not lead to clearly identify a consistent set of best performers over the period. In other words, a BMA conducted starting on any one given year would have led to chose banks which in subsequent years were no longer the better performers, thus casting a shadow over the sustainability of their prior superior performance and ultimately on their suitability as reference points for other players.

These findings need to be further investigated but would suggest that

structural reforms such as ring-fencing commercial banking activities would not necessarily lead to more stable banks but possibly to banks which could be easier to resolve. Lastly, as concerns more specifically BMA, it could be argued that in the period sample banks endeavoured to pursue more attractive business models even without being nudged by regulators, however it may have proved not to be so easy improve profitability with or without a change in business models irrespective of their potential wish to do so.

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Chapter 1

The big bank theory

Into the bank Corporate Governance literature

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A systematic literature review is conducted on a sample of articles published on peer-reviewed academic journals. Balancing theoretical and empirical contributions, findings show that academic research on bank Corporate Governance is mainly focused on risks potentially faced by banks and their performance capabilities. This paper examines the developments of bank Corporate Governance literature and tries to shed some light on the causality dilemma between theory and practice, by investigating whether or not the progress of regulation and supervision in the area of bank governance follows academic findings or vice versa.

Keywords: Banks, Corporate Governance, Board of Directors, Risk management, Compensation, Ownership

1.1 Introduction

Soundness of the financial and banking system underpins economic growth by ensuring an effective and efficient allocation of resources (Levine and Zervos, 1998; Beck et al., 2000; Levine et al., 2000; Claessens and Laeven, 2003) and exerting an important influence on Corporate Governance of firms (Franks and Mayer, 2001; Santos and Rumble, 2006; Dika et al., 2013).

Indeed, as further investigated in this paper, both academics and practitioners, claim that failures and weaknesses of bank Corporate Governance caused, to an important extent, the financial crisis that commenced in 2007 and plagued the economy until the recent years (Kirkpatrick, 2009; Al-Sa'eed, 2012).

As a matter of fact, several studies support the need for banks to be subject to specific governance provisions due to the complex and opaqueness of their business (Caprio and Levine, 2002; Levine, 2004; Macey and O' Hara, 2003; Brogi, 2008). Bank Corporate Governance indeed appears to be different from that of other firms (Hopt, 2013, Becht et al., 2011; Mehran et al., 2011), therefore financial intermediaries are unique also from a Corporate Governance perspective (Llewellyn, 2002).

While there is a growing body of literature on governance of financial institutions there is notably a lack of a comprehensive vision of the topic (Macey and O'Hara, 2003; Adams and Mehran, 2005; Caprio et al., 2007). Furthermore, there is a striking gap between the perspective of regulators and supervisors and main academic researches and findings.

In order to assess to what extent academic knowledge supports decisions taken by regulators and supervisors we first examine the academic debate concerning bank Corporate Governance by conducting a systematic literature review on 120 scholarly publications in the period 1980[1] -2015 selected among peer-reviewed academic journals.

[1]First paper included in the sample.

This paper speaks to the call by Macey and O'Hara (2003), Adams and Mehran (2005), Caprio et al. (2007) for a better understanding of the specific issues of bank Corporate Governance development and tries to shed some light on the causality dilemma between theory and practice, by investigating whether or not the progress of regulation and supervision in the area of bank governance follows academic findings. Hence, this research balances theoretical and empirical contributions in Corporate Governance literature, moreover findings of this paper have relevant policy implications by making a clear and concrete contribution on the on-going debate on bank Corporate Governance.

The main findings of this paper lead to assert that there is an increasing understanding of the fundamentals of bank Corporate Governance such as board structure, committees, risk management, and ownership structure. This result stands out from both banking and institutional perspective. Indeed, authorities have introduced several provisions with the aim of strengthening risk management regulation, and assessing the accuracy and usefulness of information provided to and from banks' directors also by engaging more frequently with board and management. Notwithstanding this, standard setters and regulators tend to focus respectively on what the board should do and must do and the necessary competences of board members as opposed to structural characteristics (Basel Committee on Banking Supervision, 2010; FSB, 2013; Directive 2013/36/EU or CRD IV; Bank of Italy, 2008) (Brogi, 2011).

Nonetheless, there is still a lot of work to do to implement sound Corporate Governance. This paper examines the developments of bank Corporate Governance literature trying to shed some light on the causality dilemma between theory and practice, by investigating whether or not the progress of regulation and supervision in the area of bank governance follows academic findings or viceversa. There is a long term supervisory perspective resulted by the investigation of the literature the purpose of banks' Corporate Governance

is less to safeguard shareholders and investors, but to safeguard depositors and other debt holders.

The remainder of this paper is organized as follows: in paragraph 2, Corporate Governance is broadly defined to include the interface between economic and financial environment; the method used to conduct the research and the composition of the sample is described in paragraph 3; paragraph 4 presents a review of the relevant literature on Corporate Governance in banking and compares it with the regulatory and supervisory provisions to contribute to the ongoing debate on the topic starting from the board structure; finally, policy implications as well as provocative areas for future research are discussed.

1.2 Corporate Governance

Corporate Governance can be broadly defined as processes and relations by which firms are managed. A first definition of Corporate Governance is given by Prowse (1998): *"Corporate Governance is rules, standards and organisations in an economy that governs the behaviour of corporate owners, directors, and managers and define their duties and accountability to outside investors, i.e., shareholders and lenders"*.

A more detailed definition of Corporate Governance is provided by the OECD: *"Corporate Governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. Corporate Governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined"* (OECD, 2004; 2015). In short, Corporate Governance arrangements allocate rights and responsibilities among agents of every firms and affected stakeholders (e. g. board of directors, executive managers, shareholders, regulators). Indeed, much of the contemporary debate regarding Corporate Governance has been focused on how to deal with conflicting stake-

holder interests. The latter have given rise to different theories that are the object of on-going debates for both academics and regulators (in particular: agency theory (Jensen and Meckling, 1976; Eisenhardt, 1989; Yermack, 1996; Eisenberg et al., 1998); resource based view (Mahooney, 1992; Peteraf, 1993; Wernerfelt, 1995, Coff, 1999); transaction costs theory (Williamson, 1979; 1981); stakeholders' theory (Freeman, 1984); stewardship theory (Donaldson, 1990; Donaldson and Davis, 1991; 1994; Davis et al., 1997)).

As concerns the institutional debate on Corporate Governance, though regulations vary worldwide, general, non-binding principles have been issued by various international organisations (Brogi, 2008) (such as stock exchanges, international organisations, associations, institutional investors mainly) in the last two decades in co-operation with governments of different countries, referred to both listed and unlisted companies. The most relevant Principles have been issued by The Committee on the Financial Aspects of Corporate Governance (the Cadbury Report, 1992); The Organisation for Economic Co-operation and Development (OECD) (Principles of Corporate Governance (originally developed in 1999, then updated in 2004 and finally revised in 2015 with the co-operation of G20 Organisation)); The Federal Government in the United States (the Sarbanes-Oxley Act, 2002); the European Commission (the Commission Recommendation on the role of non-executive or supervisory directors of listed companies and on the committees of the (supervisory) board 2005/162/EC) and the United Kingdom Government (UK Governance code, 2010).

In particular OECD Principles are aimed to preserve the basis for an effective Corporate Governance framework; outline the rights and equitable treatment of shareholders and key ownership functions; define the role of stakeholders in Corporate Governance, the role of disclosure and transparency in perceiving the companies' objectives and the responsibilities of the board (OECD, 2004; 2015).

Financial institutions require a distinct analysis of Corporate Governance issues (Adams and Mehran, 2003; Macey and O'Hara, 2003) as well as specific regulatory measures due to the complexity and opaqueness of their business (Levine, 2004; Mehran et al., 2011). A broad description of banking activities concerns in credit allocation and financial services provision in order to reduce transaction costs and asymmetric information (Batthacharya and Thakor, 1993; Allen and Santomero, 1998). They also play a decisive role in the Corporate Governance of other firms (Franks and Mayer, 2001; Santos and Rumble, 2006; Dika et al., 2013) by overseeing investment decisions. To sum up, Caselli (2010) argues that *"governance and strategy takes place in a broad perspective in which banks and the financial system have to deal with five significant factors today: regulations, customers, knowledge, capital and synergies"*. As a matter of fact, when banks are efficient, they facilitate growth and stability for the economy as a whole by ensuring an effective and efficient resource allocation (Levine and Zervos, 1998; Beck et al., 2000; Levine et al., 2000; Claessens and Laeven, 2003; Kyereboah-Coleman and Biekpe, 2006).

The unique characteristics of financial intermediaries also encompass their Corporate Governance (Llewellyn, 2002). Indeed, OECD Principles have also been adopted as one of the Financial Stability Board's (FSB) Key Standards for Sound Financial Systems serving FSB, G20 and OECD members; have been used by the World Bank Group and are an effective tool for implementation of the Guidelines on Corporate Governance of banks issued by the BCBS (OECD, 2004; 2015; BCBS, 2015).

In particular, the BCBS (2015) has recently provided a definition of bank Corporate Governance that broadly describes the role of Corporate Governance from bankers' perspective: *"Corporate Governance determines the allocation of authority and responsibilities by which the business and affairs of a bank are carried out by its board and senior management"*[2].

[2] *"Corporate Governance determines the allocation of authority and responsibilities by which the business and affairs of a bank are carried out by its board and senior management*

Moreover, the European Commission (EC) and the European Banking Authority (EBA) have developed a new regulatory framework to implement these new standards in the European Union (EU) (Regulation (EU) No 575/2013 also known as CRR and Directive 2013/36/EU or CRD IV).

The following section shows the procedure run to assess the review and describes the main characteristics of the sample.

1.3 Methodology and population of the sample

1.3.1 Methodology

Consistent with prior systematic assessments of governance literature (e. g. Pugliese et al., 2009; Abatecola et al., 2013) the selection process is performed as follows:

1. Choose Scopus and ScienceDirect as research databases;

2. Select all articles published in journals with a peer reviewed evaluation process, written in English language thereby excluding books, chapters in books, conference proceedings, working papers and other unpublished works so as to ensure the comparability of the contents;

3. Ensure substantive relevance of the potential articles by looking for the combination of *"Corporate Governance"* and (*"banks"* or *"financial institutions"*) in the keywords of the articles;

[...]", including how they: set the bank's strategy and objectives; select and oversee personnel; operate the bank's business on a day-to-day basis; protect the interests of depositors, meet shareholder obligations, and take into account the interests of other recognised stakeholders; align corporate culture, corporate activities and behaviour with the expectation that the bank will operate in a safe and sound manner, with integrity and in compliance with applicable laws and regulations; and establish control functions. Basel Committee on Banking Supervision (BCBS), Corporate Governance principles for banks, July 2015.

4. Ensure relevance of the articles by reading all abstracts checking for a discussion related to bank Corporate Governance following the "fit for purpose" approach by Boaz and Ashby (2003) and Denyer et al. (2008); e. Survey remaining articles by a complete reading in order to check substantive relevance for a discussion related to bank Corporate Governance;

5. Consolidate results.

This leads to identify a sample of articles published in top finance and management journals[3] from 1980 to 2015. Furthermore a content analysis is then run following Insch et al. (1997), Bos and Tarnai (1999) and Guthrie et al. (2004) so as to analyse the development of research on bank Corporate Governance, by classifying all basic elements of each paper: (1) type of article; (2) impact factor of the journal and cites of the article; (3) main research topic and research question(s); (4) dataset, period of observation and geographical setting; (5) methodology, including variables and robustness checks; (6) result(s)

[3]American Economic Review (AER); Applied Economics Letters (AEL); Applied Financial Economics (AFE); Banca Impresa Societá (BIS); Business Strategy & the Environment (BSE); Contemporary Economics (CE); Corporate Governance: An International Review (CGIR); Corporate Ownership & Control (COC); Economic Modeling (EM); Economic Policy Review (EPR); Emerging Markets Review (EMR); European Economic Review (EER); European Journal Economics (EJE); European Journal of Law & Economics (EJLE); Financial Management (FM); International Journal of Business & Management (IJBM); International Journal of Economics & Finance (IJEF); International Journal of Managerial Finance (IJMF); International Review of Economics & Finance (IREF); International Review of Financial Analysis (IRFA); Journal of Accounting & Economics (JAE); Journal of Banking and Finance (JBF); Journal of Business & Social Sciences (JBSS); Journal of Business Ethics (JBE); Journal of Business Finance & Accounting (JBFA); Journal of Corporate Finance (JCF); Journal of Corporate Law Studies (JCLS); Journal of Economics & Business (JEB); Journal of Economics & Finance (JEF); Journal of Financial & Quantitative Analysis (JFQA); Journal of Financial Economics (JFE); Journal of Financial Intermediation (JFI); Journal of Financial Research (JFR); Journal of Financial Services Research (JFSR); Journal of Financial Stability (JFS); Journal of International Business Studies (JIBS); Journal of International Money & Finance (JIMF); Journal of Law & Economics (JLE); Journal of Management & Governance (JMG); Journal of Monetary Economics (JME); Journal of Money, Credit & Banking (JMCB); Journal of Risk Management in Financial Institutions (JRMFI); Pacific Basin Finance Journal (PBFJ); Quarterly Review of Economics & Finance (QREF); Review of Economic Perspectives (REP); Review of Economics & Statistics (RES); Review of Finance (RF); Review of Financial Economics (RFE); Review of Financial Studies (RFS); The Accounting Review (AR); The Journal of Finance (JF).

and conclusion(s).

1.3.2 Population of the sample

The research conducted on the whole set of articles, outlined that the attention regarding banking Corporate Governance is mainly focused on risks potentially faced by banks and their performance capability.

The most frequent topics in the bank Corporate Governance literature are board structure, risk management, executive compensation, ownership structure that are normally investigated considering their impact on risks and performance drivers. In particular, as revealed by Financial Stability Board (FSB, 2013) board structure covers the functions and responsibilities of the board in ensuring that the *"firm has an appropriate risk governance framework given the firm's business model, complexity and size which is embedded into the firm's risk culture"*. Risk management function is responsible for identifying, measuring, monitoring, and recommending strategies to control and mitigate risks. It also reports on risk exposures of firms, so as to ensure a risk profile in line with the Risk Appetite Framework (RAF) approved by the Board of Directors. As concerns executive compensation, it is related with risk since an inadequate compensation structure may lead to excessive risk-taking. Finally, there is a wide strand of literature that relates risk and performance to the ownership structure and its concentration. Thus, breakdown based on the main research direction presented in each paper, leads to identify four main areas of interest Table 1.1: Board structure (46 papers, corresponding to 32% of the sample); Risk management (39, 27%); Ownership structure (32, 22%); Compensation (26, 18%).

Moreover, the most cited articles for each of the topics, are respectively Macey and O'Hara (2003) published in Economic Policy Review with 618 cites on Google Scholar; Barth et al. (2004) in Journal of Financial Intermediation with 1785 cites (which is also the most cited article in the full sample), Altunbas

Table 1.1. Composition of the sample

Topic	N. of articles	N. of articles (%)
Board Structure	46	32%
Risk Management	39	27%
Ownership	32	22%
Compensation	26	18%
Total	143	

Authors' own elaboration

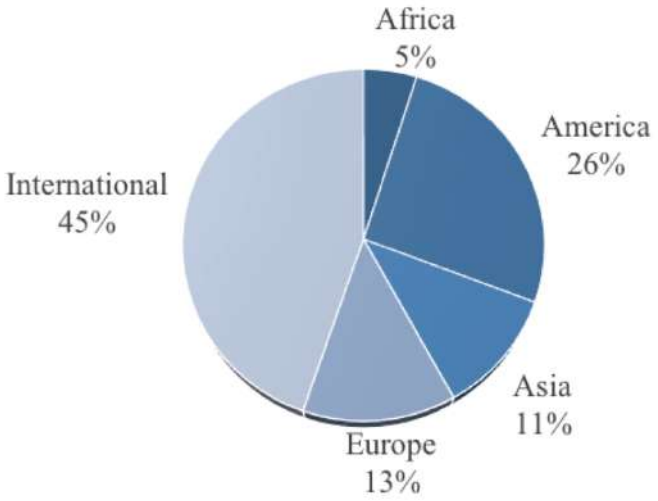

Figure 1.1. Research setting
Authors' own elaboration

(2001) and Berger (1995b) in Journal of Money, Credit & Banking with 556 and 756 cites, respectively. Table 1.2 shows the 30 Journals which have been most cited in bank Corporate Governance articles, considering average citations per article. The Journal that received the highest average citations is Journal of Financial Economics, that published 4 articles on bank Corporate Governance. Conversely, Journal of Banking & Finance published the largest number of articles on bank Corporate Governance, 32, with 150 average citations per article considering year of publication. Geographical setting reveals that the majority of articles (45%) covers a sample of International banks, 26% is based on American banks, 13% on European banks, 11% on Asian banks and 5% of the articles in the sample are conducted on African banks (Figure 1.1).

Figure 1.2 shows the breakdown of different topics by geographical setting. In particular, it is notable a larger focus on compensation in American and International samples of banks (respectively of 7% and 6% of the full sample of articles). This could be a result deriving from the largest distribution of data regarding American banks compared with other Continents. Figure 1.3 shows the historical development in bank Corporate Governance literature, broken down by topic. As above mentioned the first article included in the sample has been published in 1980, hence the period of this analysis covers the period 1980-2015. As illustrated in the figure, bank Corporate Governance has become an increasingly important area for research in the last decade, especially as a reaction to the last financial crisis. Starting from 2008 the number of articles increased over time with two major peaks in 2011 and 2013. In particular, noteworthy is the increasing interest on Board Structure since the financial crisis, in line with the general historical development on bank Corporate Governance. contrariwise, compensation appears to be a hot topic for researchers in two waves, in the period 1993-1997, and in 2011-2015, when the literature starts to depict executive compensation as one of the causes of the financial crisis of 2007, due to its link with excessive risk-taking (Fahlenbrach and Stulz, 2009; Beltratti and Stulz, 2009; DeYoung et al., 2009; Erkens et al., 2009). A more detailed discussion of the findings is given by the following section, divided into the four different groups.

1.4 Board structure

The Board of Directors (BoD) plays an important role in the governance arrangements of any firm (Fama and Jensen, 1983a; 1983b; Williamson, 1983). The main functions of the BoD are controlling and advising (Zahra and Pearce, 1989; Gabrielsson and Huse, 2004). The control function consists in the supervision of managers' activities so as to preserve shareholders' interests.

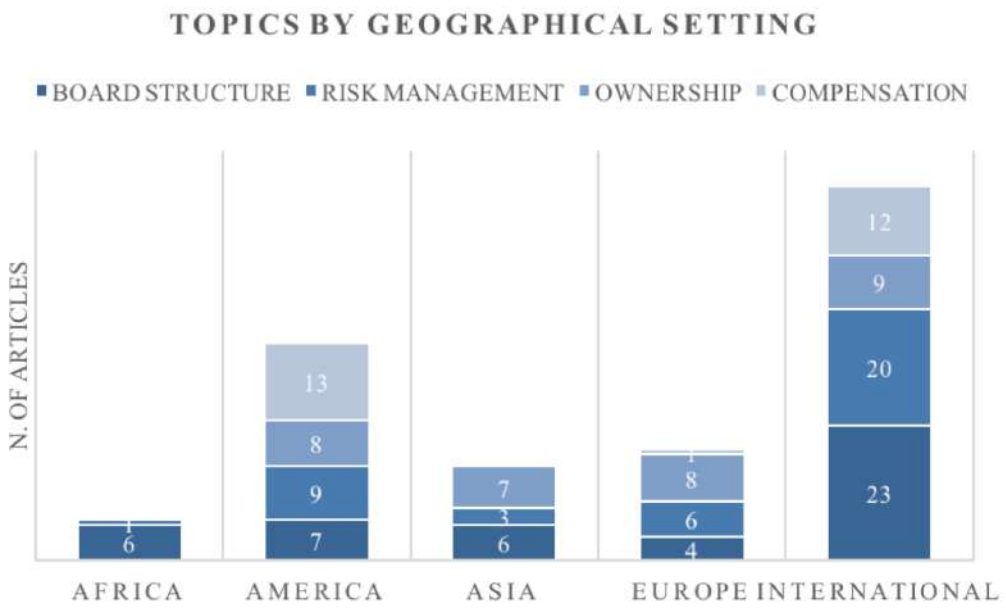

Figure 1.2. Topics by geographical setting
Authors' own elaboration

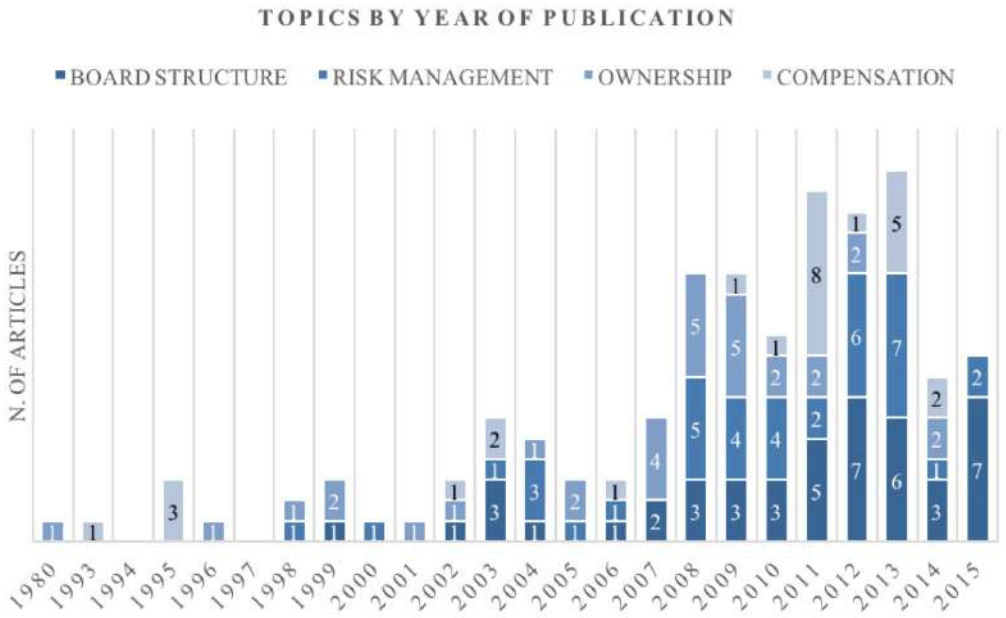

Figure 1.3. Topics by year of publication
Authors' own elaboration

Table 1.2. Top 30 cited Journal in bank Corporate Governance

Journal	N. of articles	Total cites (Google Scholar)	Average of cites (Google Scholar)	Std. Dev. of cites (Google Scholar)
JFE	4	3129	782	316
JMCB	2	1322	661	95
EPR	4	1482	371	215
JFE	4	1359	340	377
JFI	8	2555	319	574
JME	3	793	264	71
IREF	1	162	162	-
JBF	32	4801	150	152
JFQA	2	250	125	-
FM	1	120	120	-
JCF	7	680	97	114
IJMF	2	186	93	55
JEF	1	85	85	-
JFS	2	164	82	73
RES	1	82	82	-
JFR	2	161	81	48
AFE	1	79	79	-
JIMF	1	75	75	-
RFE	1	70	70	-
AR	1	69	69	-
JLE	1	68	68	-
JEB	4	259	65	56
PBFJ	2	109	55	7
JAE	2	105	53	42
RFS	1	49	49	-
BSE	1	42	42	-
RF	5	177	35	15
JFSR	3	97	32	16
JBFA	1	30	30	-
CGIR	8	239	30	25
Others	44	286	13	12
Total	143	19085	133	244

Authors' own elaboration

As an advisor, the board supports strategic business decisions by providing opinions and directions to managers. As concerns financial institutions and in particular banks, the monitoring function is a crucial task for the board, due to the complexity and opaqueness of their business model (Levine, 2004; Mehran et al., 2011).

From an institutional perspective, improving board structure is considered vital by international standard setters in order to enhance Corporate Governance functioning (OECD, 2004; 2015; BCBS, 2006; 2010; 2015). Both the

EBA and the BCBS consider BoD as one of the main internal governance features of banks. Directors are responsible for delegating power within the institution and setting objectives for the bank and the levels of risk-appetite. The BoD is also responsible for the organization of the internal control system (EBA, 2011). Board of directors has *"overall responsibility for the bank, including approving and overseeing management's implementation of the bank's strategic objectives, governance framework and corporate culture"* (BCBS, 2015). Moreover, *"The board should structure itself in terms of leadership, size and the use of committees so as to effectively carry out its oversight role and other responsibilities. This includes ensuring that the board has the time and means to cover all necessary subjects in sufficient depth and have a robust discussion of issues"* (BCBS, 2015).

As mentioned in the introduction, contributions try to identify how board characteristics influence effectiveness and this mainly relate them to performance drivers and risk measures. Articles on board structure may be further subdivided in four different research sub-topics: board size, independence, diversity and CEO duality.

1.4.1 Size

Size is one of the characteristics that could be crucial in the effectiveness of BoD functioning (de Andres and Vallelado, 2008; Pathan, 2009; Grove et al., 2011; Adams and Mehran, 2011).

As above mentioned, boards' key roles are controlling and supporting firm's strategy. Indeed, Corporate Governance literature that examines the effect of board size (reviewed by Shleifer and Vishny, 1997; Denis and McConnell, 2003; Bebchuk and Weisbach, 2009) mainly outlined two alternative theories: the agency theory (Jensen and Meckling, 1976; Fama and Jensen, 1983a; 1983b; Jensen, 1993; Yermack, 1996; Eisenberg et al., 1998) which focuses on the relevance of board monitoring and argues that larger boards may reduce

effectiveness and the resource based view (Pfeffer, 1972; Pfeffer and Salancik, 1978; Hillman and Dalziel, 2003) that posits that larger boards may provide expertise and resources that are required to deal with complex activities and thus lead the board to be more effective in its advisory role.

Even though a great number of articles have investigated the impact of board size, evidence is inconclusive and confirms that in Corporate Governance of banks (as well as companies) one size does not fit all (Coles et al., 2008).

Adams and Mehran (2003; 2012) find support for the resource based view and specifically that BHC boards are larger than those of manufacturing firms, although they have been declining in size over time (Adams, 2003). Furthermore, the authors use a sample of 32 Bank Holding Companies from 1986 to 1999 to investigate the relationship between the natural logarithm of board size and Tobin's Q. Their results suggest that larger boards enhance banks' performance and this result could be driven by a larger number of directors with subsidiary directorships within larger boards, that could contribute in dealing with organizational complexity (Adams, 2003; 2012). Though it is not the main focus of their article, with Aebi et al. (2012) using data on 573 US banks over the crises period (1st July 2007 to 31st December 2008) find that a larger board increases bank performance, measured by Return On Equity (ROE) and buy and hold returns, although board size is not the main focus of the article.

Consistent with this result, Belkhir (2009), using panel data techniques with an Ordinary Least Squares (OLS) estimation method, shows a positive relation between the logarithm of board size and two different measures of performance (Tobin's Q and Return On Assets (ROA)) on an International sample composed by 174 banks and savings and loan holding companies, over the 1995-2002 period. Chahine and Safieddine (2011) run a fixed-effect model to examine the effect of board size and composition on performance using 749 Lebanese bank years' data during 1992-2006. The authors find that bank

performance (measured by ROA and ROE) is positively related to board size.

Conversely and consistent with the agency theory, other studies support a negative association between board size and bank functioning, measured by both risk and performance.

Staikouras et al. (2007) find that large boards negatively influence bank profitability (measured by ROA, ROE and Tobin's Q) of a sample of 58 large European banks. Uwuigbe and Fakile (2011) use Nigerian Stock Exchange factbook data published in 2008, containing information on board size and performance proxies. The authors find that a smaller board size enhances financial performance and reduces free-riding problems in Nigerian banks.

Pathan and Faff (2013) conduct a two-step system Generalised Moments Method (GMM) estimation method and an OLS regression of different performance measures (Pre-Tax Operating Income, Average ROE, Average ROA, Net Interest Margin, Tobin's Q and Average Stock Return) and find a significant and negative relationship with board size for a sample of 300 Bank Holding Companies (BHCs) over the period 1997-2000. Wang et al. (2012) study the relationship between Corporate Governance and performance by using an innovative two-stage approach based on Capital Adequacy, Asset Quality, Management Earnings and Liquidity (CAMEL) rating. The authors find that there are negative impacts of board size on US BHCs' performance in 2007.

Liang et al. (2013) analysing a sample of 50 largest Chinese banks during 2003–2010 find that board size has a significantly negative impact on bank performance and bank loans quality.

Lastly, there are numerous articles that do not find any statistically robust relationship between board size and bank functioning that led researchers to question to what extent board size matters for firm performance.

Simpson and Gleason (1999) find no effect of the number of directors on the probability of financial distress as well as Belkhir (2009), analysing 174 US financial companies. This is also consistent with results outlined by Brogi

(2011) in comparing the influence that board size exerts respectively on 67 firms and 33 banks performance.

Finally, Erkens et al. (2012) do not find that board size is related to bank performance during the crisis. Conversely, de Andres and Vallelado (2008) analyse data of 69 banks from six OECD countries over the period 1995-2005. The authors obtain a hump-shaped relationship between board size and performance that suggests that the ideal number of bank directors to be around 19.

Results extend Larcker et al. (2007) and Grove et al. (2011) that find some evidence for an inverted U-shaped relationship between ROA and board size. Figure 1.6 and Figure 1.7 summarise results from a sub-sample of articles that apply comparable methodologies.

Literature regarding the relationship between board size and risk is relatively more recent possibly fuelled by the financial crisis that evidenced the shortcomings of Return on Equity as a measure of performance in banking. Again, mixed results emerge.

Pathan (2009) and Minton et al. (2010) find that bank board size of US banks is negatively related to risk-taking (measured as total risk, idiosyncratic risk and systematic risk) during the pre-crisis period. This is also consistent with the study of Faleye and Krishnan (2010) that find that smaller boards ensure fewer junk loans provisioning of banks and are also reduce speculative actions on a sample of 51 banks over 1994–2006. Rachdi and Ameur (2011) explore data of 11 large Tunisian commercial banks over the period 1997-2006 in order to investigate whether board characteristics affect performance and incentives to take risk in banking industry. Using both Generalized Least Square (GLS) Random Effect (RE) and GMM system approaches, their results support the idea that bank board structure is a determinant factor for bank performance and bank risk-taking. In particular, the authors find a small bank board is associated with more performance (measured by ROA and

ROE) and with more bank risk-taking (Z-score). Berger et al. (2012) argue that during the recent financial crisis board size, as well as other Corporate Governance characteristics of US commercial banks are not related to bank stability (measured in terms of probability of default). Garcia-Marco and Roblez-Fernandez (2008) exploring a sample of Spanish banks, show that board size matters for risk-taking, and in particular they find smaller size institutions assuming lower risks, due to a moral hazard behaviour. More recently, Elyasiani and Ling (2015) investigate the association between busy directors and both bank performance and risk by employing the 3 Stages Least Squares (3SLS) technique. Though their main focus is the impact of risk management characteristics on banks performance, the authors find that performance and board size do not have a significant relationship, whereas the number of directors is strongly and positively associated with higher risk-taking (total, market, idiosyncratic, credit and default risks).

The analysis result in a there is a noteworthy lack of univocal consensus about an adequate board size in order to enhance performance and risk-avoiding. This is also notably from an institutional perspective. The BoD should *"periodically, and at least annually, assess the structure, size, composition and performance of the management body and make recommendations to the management body with regard to any changes"* (CRD IV). This is in line with the BCBS Principles (2015) that suggest to BoD to *"periodically review its structure, size and composition as well as committees' structures and coordination"*.

Standard setters and regulators tend to focus respectively on what the board should and must do and therefore underline the importance of the competences of board members as opposed to the structural characteristics of the board (Bank of Italy, 2008; BCBS, 2010; 2015; Brogi, 2011). Indeed, since 2012, EBA has provided *"Guidelines on on the assessment of the suitability of members of the management body and key function holders"* with the aim

of defining the assessment process regarding the suitability of a member and other criteria relevant *"for the functioning of the management body, including potential conflicts of interest, the ability to commit sufficient time, the overall composition of the management body, the collective knowledge and expertise required and members ability to perform their duties independently without undue influence from other persons."* Furthermore, the implementation of these Guidelines has been surveyed in June 2015 by EBA, resulting in divergent supervisory practices. Hence, EBA concluded that *"the existing EBA guidelines have not led to sufficient convergence in supervisory practices, and proposed the incorporation in its forthcoming review of the guidelines of a number of specific best practices observed."* Also, the BCBS (2010; 2015) focuses on what the board should do[4] without providing specific rules regarding banks' board structure. Nonetheless, the majority of the 40 jurisdictions surveyed by the OECD in the 2015 and 2017 Corporate Governance factbook set the minimum board size as low as three or five members, while a maximum board size requirement is less common, with only eight jurisdictions setting a limit ranging from 11 to 21 (OECD, 2017)[5] (Tables 1.4 and 1.5).

[4] *"Board members should be and remain qualified, individually and collectively, for their positions. They should understand their oversight and Corporate Governance role and be able to exercise sound, objective judgment about the affairs of the bank."* (BCBS, 2010; 2015).

[5] Eight jurisdictions set forth a maximum board size ranging from 11 to 21, while the others leave it to the company's discretion. Twenty-five jurisdictions set forth a minimum board size of three or five (seven for large companies in Chile and 12 for the companies with two-tier boards in Norway). In the two-tier board system, no jurisdiction sets a maximum size requirement for the management board, while some jurisdictions set a minimum size requirement (five in Norway, two in Italy and one in Estonia, Germany, Poland and Slovenia) (OECD, 2017).

Jurisdiction	Tier	Board of directors (Supervisory board: two-tier system)			Management board (two-tier system)			
		Size		Appointment	Size		Appointment	
		Minimum	*Maximum*	*Maximum term year*	*Minimum*	*Maximum*	*Maximum term year*	*By*
Argentina	2	3	-	3 to 5	No size requirement		-	GSM
Australia	1	3	-	[3]				
Austria	2	No size requirement		5	No size requirement			SB
Belgium	1	3	-	6				
Brazil	1	3 (-)	- (-)	3 (2)				
	2	3	5	-	3	-	3(2)	GSM
Canada	1	3	-	-				
Chile	1	5 or 7	-	3				
China		3		3	5	19	3	GSM
Colombia	1	5	-[*1]	-				
Czech Republic	1+2	No size requirement		-	No size requirement		-	GSM, SB
Denmark	1+2	No size requirement		4 (1)	No size requirement		(1)	SB
Estonia	2	No size requirement		5	1	-		SB
Finland	1+2	No size requirement		(1)				
France	1+2	3	18	6 (4)	1	7	6	SB
Germany	2	3	21	5	1-2	-		SB
Greece	1	3 (7)	- (15)	6 (4)				
Hong Kong, China	1	[3][*2]	-	(3)				
Hungary	1+2	(3)	-	(5)	3	-	-	GSM
Iceland	1	No size requirement		-				
India	1	3	15[*3]	3[*3]				
Indonesia	2	2	-	5	2	-	5	GSM
Ireland	1	No size requirement		-				
Israel	1	4[*4]	-	-				
Italy	T+1	No size requirement		3				
	2	3	-	3	2	-	3	SB
Japan	C+S	3	-	1				
	A	3	-	2				
Korea	1	3 (smaller for SMEs)	-	3				
Latvia	2	5	20	5	3	-	5	SB
Luxembourg	1+2	No size requirement		-				
Mexico	1	- (3)	21 (15)	-				
Netherlands	1+2	No size requirement		(4)	No size requirement		(4)	GSM
New Zealand	1	No size requirement		-				
Norway	1	3	-	4 (2)				
	2	12	-	4 (2)	5	-	-	SB
Poland	2	5	-	5	1	-	5	SB
Portugal	2C+2A+2G	No size requirement[*5]		4	No size requirement		4	SB/GSM[*6]
Russia	2	5	-	1	No size requirement		-	GSM[*7]

Figure 1.4. Board size and directors tenure for listed companies
OECD (2017), Corporate Governance factbook

Jurisdiction	Tier	Board of directors (Supervisory board: two-tier system)			Management board (two-tier system)			
		Size		Appointment	Size		Appointment	
		Minimum	*Maximum*	*Maximum term year*	*Minimum*	*Maximum*	*Maximum term year*	*By*
Saudi Arabia	1	3	11	3				
Singapore	1	3	-	(3)				
Slovak Republic	1+2	No size requirement		-	No size requirement		-	
Slovenia	1+2	3	-	6	1	-	6	SB
South Africa	2	3	-	-	-	-	3	GSM
Spain	1	3	-	5				
Sweden	1	3	-	1				
Switzerland	1+2	No size requirement		1				
Turkey	1	5	-	3[*8]				
United Kingdom	1	2	-	(1)				
United States	1	(3)[*9]	-	3[*9]				

Figure 1.5. Board size and directors tenure for listed companies *(cont.d)*
OECD (2017), Corporate Governance factbook

Figure 1.6. Board size and performance
Authors' own elaboration

Publication	Sample	Period	Setting	Method	Performance indicator	Sign	Significance
Belkhir, Mohamed. "Board of directors' size and performance in the banking industry." International Journal of Managerial Finance 5.2 (2009): 201-221.	260 banks	2002	International	OLS	Tobin's Q; ROA	+	***
Adams, Renée B., and Hamid Mehran. "Bank board structure and performance: Evidence for large bank holding companies." Journal of financial Intermediation 21.2 (2012): 243-267.	32 BHCs	1986-1999	International	OLS	Tobin's Q	+	*
Aebi, Vincent, Gabriele Sabato, and Markus Schmid. "Risk management, Corporate Governance, and bank performance in the financial crisis." Journal of Banking & Finance 36.12 (2012): 3213-3226.	573 banks	2006	USA	OLS	Buy and hold returns	+	
Staikouras, Panagiotis K., Christos K. Staikouras, and Maria-Eleni K. Agoraki. "The effect of board size and composition on European bank performance." European Journal of Law and Economics 23.1 (2007): 1-27.	58 banks	2002-2004	Europe	OLS	ROA; ROE; Tobin's Q	-	*
Pathan, Shams, and Robert Faff. "Does board structure in banks really affect their performance?." Journal of Banking & Finance 37.5 (2013): 1573-1589.	300 BHCs	1997-2011	USA	GMM; OLS	Pre-Tax Operating Income; ROAA; ROAE; Net Interest Margin; Tobin's Q; Average stock Return	-	***
Liang, Qi, Pisun Xu, and Pornsit Jiraporn. "Board characteristics and Chinese bank performance." Journal of Banking & Finance 37.8 (2013): 2953-2968.	50 banks	2003-2010	China	OLS	ROE; Pre-provision profit; NPL (stock)	-	*
De Andres, Pablo, and Eleuterio Vallelado. "Corporate Governance in banking: The role of the board of directors." Journal of banking & finance 32.12 (2008): 2570-2580.	69 banks	1995-2005	6 OECD countries	GMM; OLS	Tobin's Q	-	

Figure 1.7. Board size and performance
Authors' own elaboration

1.4.2 Independence

The BoD is the bridge between management and shareholders (OECD, 2004; 2015). Studies concerning board structure point out that the presence of independent directors (i.e. directors without direct ties with management) on the board contribute to a better monitoring of managers (Fama and Jensen, 1983a; 1983b; Boyd, 1994; Rechner and Dalton, 1991). This strand of literature also belongs to the agency theory and in particular it is related to the study of Jensen and Meckling (1976), Fama and Jensen (1983a; 1983b) and Beasley (1996). The latter argue that the agency problem deriving from the separation between ownership and control needs to be mitigated with a sound and efficient Corporate Governance. The agency relationship is the engagement of an agent (manager) to preserve and safeguard principal (shareholder)'s interests on its behalf (Jensen and Meckling, 1976). Conventional wisdom recognises that independence, diversity and expertise enhance Corporate Governance quality and safeguard shareholders' interests. Alternative views also exist on the role of independent directors.

Fama and Jensen (1983a; 1983b) and Beasley (1996) identify independence as a vital characteristic of directors to mitigate agency conflicts between management and shareholders because their role in the board permit them to perform a better critical monitoring function. A different perspective is provided by the stewardship theory (Donaldson and Davis, 1991; Kent et al., 2010). Following this view, inside and executive directors have greater knowledge than independent directors with respect to their company's characteristics and provide better decision-making.

Bank Corporate Governance literature also recognizes the level of independence of the board of directors as a critical issue for internal governance of banks. As well as corporates, banks board of directors should act in order to preserve shareholders' interest. Nonetheless, banks differ from other types of firms since they have a far wider number of stakeholders, that include

depositors and other debt holders. Thus, the monitoring function of the board of director of banks is very important. Univocal consensus on the ideal level of independent members of the board is still missing, but most of the literature shows that a higher level of outsider representation increases the likelihood of the efficient outcome for the bank, measured by performance and risk-avoiding capabilities.

Figure 1.10 and 1.11 show the findings of a sub-sample of comparable (as concern the methodology) articles.

In line with agency theory, independent directors have incentives to properly exert the control function, because they seek to protect their reputation (Pathan, 2009). Li and Song (2013) find that board independence positively affects bank value of an international sample of banks. Consistent with this view, Pathan and Skuly (2010) also find an endogenous relationship between different bank Corporate Governance characteristics. Using a sample of 212 US BHCs during the period 1997-2004, authors show that larger (in terms of assets) and more diversified banks have larger and more independent boards. In the same geographical setting, Cornett et al. (2010) extend the sample of observation to 300 publicly traded US banks during the financial crisis.

The authors find that bank performance is positively affected by a more independent board. Furthermore, de Andres and Vallelado (2008) show a non-linear (hump shaped) relationship between board independence and performance, similar to the above-mentioned result regarding the relationship between board size and performance. Liang et al. (2013) investigate the relationship between the performance of 50 Chinese banks (measured by ROE, pre-provision profit and stock of Non Performing Loans (NPLs)) during 2003-2010 using an OLS methodology. The authors find that independence of board of directors positively affects bank performance. More recently, Garcia-Meca et. al (2015), show that Tobin's Q and ROA are positively affected by the presence of a higher number of independent directors, although it is not the

main aspect studied in the article. They examine the board structure of 159 banks in nine countries during 2004-2010 using a GMM methodology, focusing especially in the impact of gender diversity on bank performance, as further investigated in this paper.

Also in line with the agency theory and consistent with the positive results in terms of performance, there is some evidence of a negative relationship between board independence and bank risk-taking. Indeed, Pathan (2009) investigating a sample composed by 212 US BHCs over 1997–2004 as in Pathan and Skully (2010), with a GLS and a RE technique, find that board independence is strongly and negatively related to bank risk (measured by total risk, idiosyncratic risk, and systematic risk). Similar results are reported in Minton et al. (2010) and Faleye and Krishnan (2010). The latter find that board independence reduces riskiness measured by the long-term S&P credit rating and inclusion of financial covenants in loan contracts, although it is not related to the lending risk diversification. Yeh et al. (2011) examine whether the performance during the recent financial crisis is better for financial institutions with more independent directors on different committees. Using the data of the 20 largest financial institutions from G8 countries during the 2007–08 financial crisis the authors show that performance during the crisis is higher for financial institutions with more independent directors on auditing and risk committees. Moreover, the influence of committee independence on bank performance is particularly relevant for civil law countries (measured by a dummy variable). Yeh et al. (2011) also suggest that regulation authorities should enforce regulation compliance to improve director independence, particularly for auditing and risk committees in banking industry, since independent directors in banking are supposed to reduce excessive risk-taking behaviours.

Even if independent directors may enhance the effectiveness of monitoring bank management, they may lack in practical bank business expertise (Adams, 2012). Thus, supporting the Stewardship Theory also in bank Corporate

Governance, Adams and Ferreira (2007) comment the negative result obtained between performance and independence with the reduction of the information among boards, due to the outside position of independents. This condition negatively affects the advisory role of the board and may also reduce its monitoring function.

Belkhir (2009) relates different characteristics of bank Corporate Governance with Tobin's Q, and find that a higher number of independent directors negatively affects the performance of an international sample of 260 banks, using an OLS methodology. Aebi et al. (2012) also find a negative relationship between the percentage of independent directors and performance but their findings are not totally supported by the significance of their results. Consistent with this view is the above-mentioned study of Pathan and Faff (2013). The authors find a negative relationship between different performance measures and independence of the board.

As in the case of board size, some authors do not find robust correlations between director independence and bank results, both in terms of performance and risk-taking. As concerns performance, Adams and Mehran (2005) and Staikouras et al. (2007) find no significant relation between the degree of board independence (measured by the percentage of independent directors) and performance. The latter looking for the effect of board composition on the performance of 58 European banks, does not find a significant relation between independence and ROA.

Adams and Mehran (2012), using a sample of 32 International BHCs receiving bailout money during 1986-1999 does not find a negative relationship between Tobin's Q and independence analysed with an OLS estimation method. Moreover, the author suggests that independence may not always have the sufficient expertise to oversee complex banking firms.

Pi and Timme (1993), Griffith et al. (2002) and Simpson and Gleason (1999), study the effect of a higher number of independent directors on bank

boards on the probability of financial distress. Nonetheless as mentioned above, there is a wider strand of literature supporting the relevance of board independence in the development of good Corporate Governance and a consequent enhancement of bank functioning (Peni and Vähämaa, 2012). Indeed, standard setters and regulators focus on board composition and favour independence. Hence, regulation and legal systems have a significant impact on internal governance arrangements of banks (Ferreira et al., 2012; Li and Song, 2013). In particular, Li and Song (2013) reach two main conclusions in their study: empowering official supervision reduces board independence and encouraging private monitoring increases board independence. These findings are consistent with Barth et al. (2004) and Beck et al. (2006).

Actually, since 2002 the Sarbanes–Oxley Act requires that boards have audit committees consisting only of independent outside directors. The Codes of Best Practice for Corporate Governance issued in many countries have called for greater outside representation (Denis and McConnell, 2003). Despite the fact that national approaches on the definition of independence[6] for directors vary considerably, and notwithstanding differences in board structure, almost all jurisdictions have introduced a requirement or recommendation with regard to a minimum number or ratio of independent directors[7]. In particular,

[6]Regarding the definition of independence, the typical criterion is a combination of: 1) not to be a member, or an immediate family member of a member, of the management of the company; 2) not to be an employee of the company or a company in the group; 3) not to receive compensation from the company or its group other than directorship fees; 4) not to have material business relations with the company or its group; 5) not to have been an employee of the external auditor of the company or of a company in the group; 6) not to exceed the maximum tenure as a board member; and 7) not to be or represent a significant shareholder (IOSCO, 2007). The legal or regulatory approaches vary among jurisdictions, particularly with regard to maximum tenure and independence from a significant shareholder. 19 jurisdictions set a maximum tenure as an independent director, varying from 5 to 15 years (with the mode at 12 years). At the expiration of the tenure, these directors are no longer regarded as independent (in 14 jurisdictions), or need an explanation regarding their independence (in five jurisdictions) (OECD, 2017).

[7]Only three jurisdictions (India, Hungary and the United States) have introduced a binding requirement for a majority independent board, while the others take a *"comply or explain"* approach. Japan amended the Company Act in 2014 and introduced a more stringent disclosure requirement than the normal *"comply or explain"* approach, requiring companies with no outside director to disclose in their annual reports the reason why

the recommendation for majority independence is mostly the standard in jurisdictions with a one-tier board system. (OECD, 2017). Also, the BCBS has advocated a BoD with an adequate number of independent directors (BCBS, 2006; 2015).

appointing one is *"inappropriate"*, as well as to explain that reason in the proxy materials of the annual shareholder meetings. Four jurisdictions (Chile, France, Israel and the United States) link the board independence requirement with the ownership structure of a company, where companies with controlling shareholders are subject to less stringent requirements. The role of independent directors in controlled companies is considered as different from that played by the same in dispersed companies, since the characteristic of the agency problem is different (e.g., the vertical agency problem is less common and the horizontal agency problem is prevalent in controlled companies) (OECD, 2017).

Jurisdiction	Tier	Board independence requirements		Key factors in the definition of independence			
		Separation of the CEO and Chair of the board	*Minimum number or ratio of independent directors*	Term		Independence from "substantial shareholders"	
				Maximum term of office & effect at the expiration of term[*1]		*Requirement*	*Shareholding threshold of "substantial shareholders" for assessing independence*
Argentina	2	-	(66%)	5	No independence	Yes	15%
Australia	1	(Recommended)	(>50%)	-	-	(Yes)	5%
Austria	2	-	(50%)	-	-	No	-
Belgium	1	(Recommended)	3	12	No independence	Yes	10%
Brazil	1	[Required][*2]	20% (30%)[*3]	-	-	(Yes)	(50%)
Canada	1	-	2	-	-		
Chile	1	Required	1	-	-	Yes	10%
China	2	-	(33%)	(6)	(Explain)	Yes	(5%)
Colombia	1	Required	25%	-	-	Yes	50%+1
Czech Republic	1+2	-	-	-	-	No	-
Denmark	1+2	-	(50%)	(12)	(No independence)	Yes	50%
Estonia	2	-	(50%)	10	No independence	Yes	-
Finland	1+2	(Recommended)	(>50%)	-	-	Yes for 2	10%
France	1+2	-	(50% or 33%)	(12)	(No independence)	(Yes)	(10%)
Germany	2	-	-[*4]	-	-	(Yes)[*5]	
Greece	1	-	2 (33%)	(12)	(No independence)	No	-
Hong Kong, China	1	(Recommended)	3 and 33%	(9)	(Explain)	Yes	10%
Hungary	1+2	-	50%	-	-	Yes	30%
Iceland	1	-	(50%)	(7)	(Explain)	Yes for 2	10%
India	1	(Recommended)[*6]	[33%]	10[*7]	No independence for 3 years	Yes	2%
		-	[50%]				
Indonesia	2	-	30%	10[*8]	Explain	Yes	20%
Ireland	1	(Recommended)	(50%) [*3]	(9)	(Explain)	No	-
Israel	1	[Required] [*9]	2 (50% or 33%)	9	(No independence)	Yes	5%
Italy	T+1+2	-[*10]	1 (or 2 if the board>7 members)[*11]	(9)	(Explain)	Yes	-
Japan[*12]	A	-	1 and (2)	-	-	Yes	50%
	C, S	-	Majority of each committee and (2)				
Korea	1	-	>50% and at least 3[*13]	-	-	Yes	Largest and all >10%

Figure 1.8. Board independence requirements for listed companies
OECD (2017), Corporate Governance factbook

Jurisdiction	Tier	Board independence requirements		Key factors in the definition of independence			
		Separation of the CEO and Chair of the board	*Minimum number or ratio of independent directors*	Term		Independence from "substantial shareholders"	
				Maximum term of office & effect at the expiration of term[*1]		*Requirement*	*Shareholding threshold of "substantial shareholders" for assessing independence*
Latvia	2	-	(50%)	10	(No independence)	No	-
Luxembourg	1+2	-	-	12	No independence	Yes	10%
Mexico	1	Required	25%	-	-	Yes	20%
Netherlands	1+2	Required	(All-1)	-	-	Yes	10%
New Zealand	1	(Recommended)		-	-		
Norway	1+2	Required	2(>50%)	-	-	Yes	10%
Poland	2	-	(2)	12	No independence	Yes	5%
Portugal	BoD	-	Adequate proportion	-	-	(Yes)	(Controlling SH or company in group relationship)
	SB	-	>50%	8	No independence	Yes	2%
Russia	2	Required	20% and 3 (33%)	(7)	(No independence)	(Yes)	(5%)[*14]
Saudi Arabia	1	Required	33% and 2			Yes	5%
Singapore	1	(Recommended)	(50%)[*15]	(9)	Explain	Yes	10%
		(Recommended)	(33%)				
Slovak Republic	1+2	(Recommended)		(15)	(No independence)	No	-
Slovenia	1+2	Required	(100%)	12	(No independence)-	Yes	-[*16]
South Africa	2	Required	Majority of non-executives	-	-	Yes	-
Spain	1	Recommended	2	12	No independence	Yes	3%
Sweden	1	Required	(>50%)	-	-	Yes for 2	10%
Switzerland	1+2	(Recommended)[*17]	(>50%)	-	-	No	-
Turkey	1	-	(33% and 2)	6	No independence	Yes	5%
United Kingdom	1	(Recommended)	(50%)	9	Explain	No	-
United States	1	-	[>50%][*18]	-	-		

Figure 1.9. Board independence requirements for listed companies *(cont.d)*
OECD (2017), Corporate Governance factbook

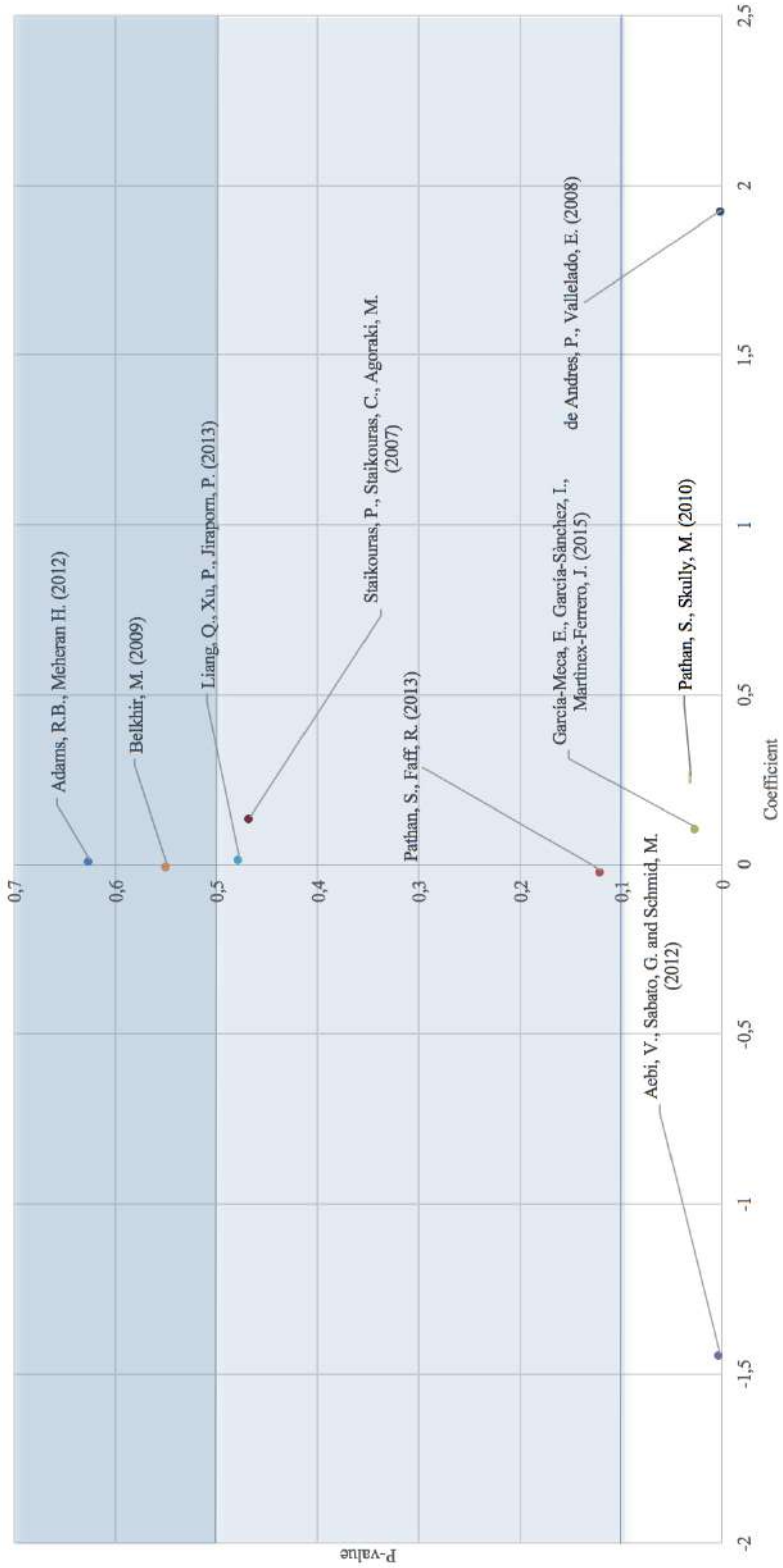

Figure 1.10. Independence and performance
Authors' own elaboration

Publication	Sample	Period	Setting	Method	Performance indicator	Sign	Significance
Pathan, Shams, and Michael Skully. "Endogenously structured boards of directors in banks." Journal of Banking & Finance 34.7 (2010): 1590-1606.	212 banks	1997-2004	USA	OLS		+	**
De Andres, Pablo, and Eleuterio Vallelado. "Corporate Governance in banking: The role of the board of directors." Journal of banking & finance 32.12 (2008): 2570-2580.	69 banks	1995-2005	6 OECD countries	GMM; OLS	Tobin's Q	+	***
Liang, Qi, Pisun Xu, and Pornsit Jiraporn. "Board characteristics and Chinese bank performance." Journal of Banking & Finance 37.8 (2013): 2953-2968.	50 banks	2003-2010	China	OLS	ROE; Pre-provision profit; NPL (stock)	+	*
García-Meca, Emma, Isabel-María García-Sánchez, and Jennifer Martínez-Ferrero. "Board diversity and its effects on bank performance: An international analysis." Journal of Banking & Finance 53 (2015): 202-214.	159 banks	2004-2010	International	GMM	Tobin's Q; ROA	+	*
Belkhir, Mohamed. "Board of directors' size and performance in the banking industry." International Journal of Managerial Finance 5.2 (2009): 201-221.	260 banks	2002	International	OLS	Tobin's Q	-	
Aebi, Vincent, Gabriele Sabato, and Markus Schmid. "Risk management, Corporate Governance, and bank performance in the financial crisis." Journal of Banking & Finance 36.12 (2012): 3213-3226.	573 banks	2006	USA	OLS	Buy and hold returns	-	***
Pathan, Shams, and Robert Faff. "Does board structure in banks really affect their performance?." Journal of Banking & Finance 37.5 (2013): 1573-1589.	300 BHCs	1997-2011	USA	GMM; OLS	Pre-Tax Operating Income; ROAA; ROAE; NIM; Tobin's Q; AVG stock Return	-	**
Staikouras, Panagiotis K., Christos K. Staikouras, and Maria-Eleni K. Agoraki. "The effect of board size and composition on European bank performance." European Journal of Law and Economics 23.1 (2007): 1-27.	58 banks	2002-2004	Europe	OLS	ROA	+	
Adams, Renée B., and Hamid Mehran. "Bank board structure and performance: Evidence for large bank holding companies." Journal of financial Intermediation 21.2 (2012): 243-267.	32 BHCs	1986-1999	International	OLS	Tobin's Q	+	

Figure 1.11. Independence and performance
Authors' own elaboration

1.4.3 CEO Duality

Another important issue in researches conducted on board structure of banks is the so-called CEO duality. It represents a situation in which the CEO of a bank is also Chair of the board of directors.

Consistent with agency theory (Jensen and Meckling, 1976) CEO duality may reduce the ability of the board in preserving shareholders' interests. Indeed, CEO may not separate personal interest from shareholders' interests and the control function of the board may be less effective (Jensen, 1993; Lasfer, 2006). Moreover, the presence of a CEO who is also the Cahir of the board can mitigate the agency problem by moderating the effect of board involvement in executive management. From this perspective in the absence of CEO duality, the requirement of a minimum level of independent directors in order to enhance the advisory function of the board may be reduced without affecting the monitoring function. The stewardship theory states that CEO duality results in a more efficient and rapid decision-making process. Nonetheless it enhances the strategic vision of the board, by providing long-term objectives in line with shareholders' interests.

Focusing on financial institutions, CEOs are key decision makers. In particular, their risk propensity has a decisive role in the definition of the strategy of the bank (Adams and Ferreira, 2007). As a consequence, their position has a strong effect on both risk and performance of a bank. Indeed, empirical research on the impact of CEO duality on banks' performance (Pi and Timme, 1993; Johnson et al., 1996; Griffith et al., 2002; Cooper, 2009; Adnan et al., 2011) and banks' risks (Simpson and Gleason, 1999; Pathan, 2009, Boujelbene and Nabila, 2011, De Jonghe et al., 2012, Rachdi et al., 2013) provide different conclusion on the impact of CEO duality, nonetheless most of the findings are not supported by sufficient significance. As concerns performance, Pi and Timme (1993) find that banks with CEOs who are also chairs of the board, over performed in respect of a situation without CEO

duality. In particular, the authors study 112 US banks during 1987–1990 and show a positive relation between CEO duality and ROA and an inverse relation with costs.

Regarding the empirical evidences of CEO duality affecting risk-taking of banks, several authors find some evidence that CEO power is negative related with bank risk-taking. In particular, Simpson and Gleason (1999) find a lower probability of financial distress when there is CEO duality using a sample of 287 banks over the period 1989–1993. They also suggest that the risk-avoiding function of a CEO who is also the Chair of the board is given by the bias of protecting his role in the board. Consistently, Pathan (2009) and Boujelbene and Nabila (2011) investigate the relationship of different Corporate Governance variables of two different samples of banks and find that the presence of a CEO who is also the Chair of the board is inversely related with bank risks. The first author uses a sample composed by 212 US BHCs during 1997-2004 and regresses CEO duality on different risk measures as total risk, idiosyncratic risk, systematic risk, assets return risk and insolvency risk). Boujelbene and Nabila (2011) use a static panel and GLS methodology on a sample of 10 commercial banks listed on the Tunisian Stock Exchange during 1995-2007 measuring risk with three different drivers: total risk, insolvency risk, and beta. The authors find that the coefficient of CEO duality is positive and statistically significant and positively associated with total risk and insolvency risk probably. This result is driven by a reduction of the control effectiveness of the governance structure, resulting in an increase in bank risk-taking. Rachdi et al. (2013) try to assess whether bank board structure is associated with risk. The authors use a sample of 11 Tunisian conventional banks over the period 2001-2011 and find that duality on boards is associated with more insolvency risk, but has no significant effect on insolvency and credit risk. De Jonghe et al. (2012) use a stochastic frontier approach on 65 commercial banks operating in Turkey between 1988 and 2009. The authors, looking for

a relationship between both internal and external governance mechanisms (respectively CEO duality, board experience, political connections, education profile and discipline exerted by shareholders, depositors, or skilled employees) and bank performance, find that the presence of a more experienced CEO (controlled by the cumulative number of years a particular manager has been at the top of his or her organization) generally increases risk/return efficiency, as suggested by human-capital theory Becker (1962). Kaymak and Bektas (2008) also observe Turkish commercial banks (27) operating in the market between 2001-2004, but their findings support the stewardship view, by showing how the presence of duality increases the risk of principal-principal conflict. The authors run a cross-sectional data analysis investigating the association of different governance drivers (board independence, CEO duality, board size, and board tenure) with bank performance measured by ROA.

Another evidence of the consistency of the stewardship view is given by Larcker et al. (2007). The latter is one of the first papers that finds CEO duality negatively impacting on performance. The authors investigate different Corporate Governance variables of a sample of 2106 financial and non-financial firms between 2002 and 2003 by using a Principal Component Analysis (PCA). This method is used to develop 14 multi-indicator indices from 39 individual governance indicators, including CEO duality. Wang et al. (2012) also report a negative impact of CEO duality on efficiency by exploring the relationship between the operating performance and Corporate Governance of 68 BHCs in the US with a modified Data Envelopment Analysis (DEA) method.

Researchers also investigate whether CEO duality is not only associated with bank risk/performance measures but also with bank functioning. Indeed, Faleye and Krishnan (2010) and Grove et al. (2011) study the relationship between CEO duality and lending activity. In particular, Faleye and Krishnan (2010) find that the probability of lending to high-risk borrowers increases with CEO duality. Grove et al. (2011) find a negative relationship with

bank performance but don't find a significant association with loan quality, by adopting the factor structure to measure multiple dimensions of Corporate Governance for 236 US public commercial banks. Savchenko and Semenova (2015), exploring the effect of combining positions between the board of directors and top management, demonstrate that there is a need for a broader approach to regulating the spheres of director responsibility, and avoid CEO duality for developed countries. They obtain this result from a sample of banks in 112 countries and measure bank profitability, both in terms of profitability for managers (ROA) and return for shareholders (ROE). However, their conclusions seem to be true only for developed economies.

Dalton et al. (1996) conducted a meta-analysis investigate whether a situation of non-duality board is related to performance, and their result reveal suggest no relationship of a meaningful level. The latter finding is consistent with the results of other later banking studies that reveal not significant relationship among variables (Griffith et al., 2002; Cooper, 2009; Adnan et al., 2011; Aebi et al., 2012; Berger et al., 2014). In particular, Griffith et al. (2002) assert that a situation in which CEO is also the Chair of the BoD, has no significant impact on performance because adding responsibilities do not result in an improving in CEO's capacity to affect performance. Cooper (2009) finds insignificant relationship between the CEO duality and bank performance (measured by Tobin's Q, Economic Value Added (EVA) and Market Value Added (MVA). Furthermore, Adnan et al. (2011) show a negative but insignificant relationship between CEO duality and bank performance. At last, Aebi et al. (2012) do not find that CEO duality affects buy-and-hold returns of US banks included in their sample. Berger et al. (2012) find no effect of CEO duality on bank default probabilities by investigating a sample of 249 bank failures and 4021 non-default US commercial banks over the financial crisis period (2007-2010). Figure 1.12 and 1.13 summarize findings of a sub-sample of comparable (as concern the methodology) articles. As reported

in the latter, the academic point of view is mainly directed to define CEO duality as a situation to be avoided by the BoD.

Institutional perspective regarding the CEO duality is largely in line with academic point of view. Indeed, the combination of the role of board Chair and CEO is possible among many of the jurisdictions with one-tier board systems. Only one-third of the jurisdictions with one-tier board systems require or encourage the separation of the Board Chair and CEO. Four jurisdictions require and eight jurisdictions recommend the separation of the two posts in *"comply or explain"* codes (OECD, 2017). To sum up, Figure 1.8 and 1.9 report National requirements concerning the separation of the CEO and the Chair of the board. Moreover, CRD IV states that *"the chairman of the management body in its supervisory function of an institution must not exercise simultaneously the functions of a chief executive officer within the same institution, unless justified by the institution and authorised by competent authorities."* As a result, National competent authorities have duties and responsibility in determining whether or not a situation of CEO duality can be specifically identified as banks' value creator. Nonetheless, there is still a lot of work to do to by regulators and authorities clarify the issue CEO duality in banks.

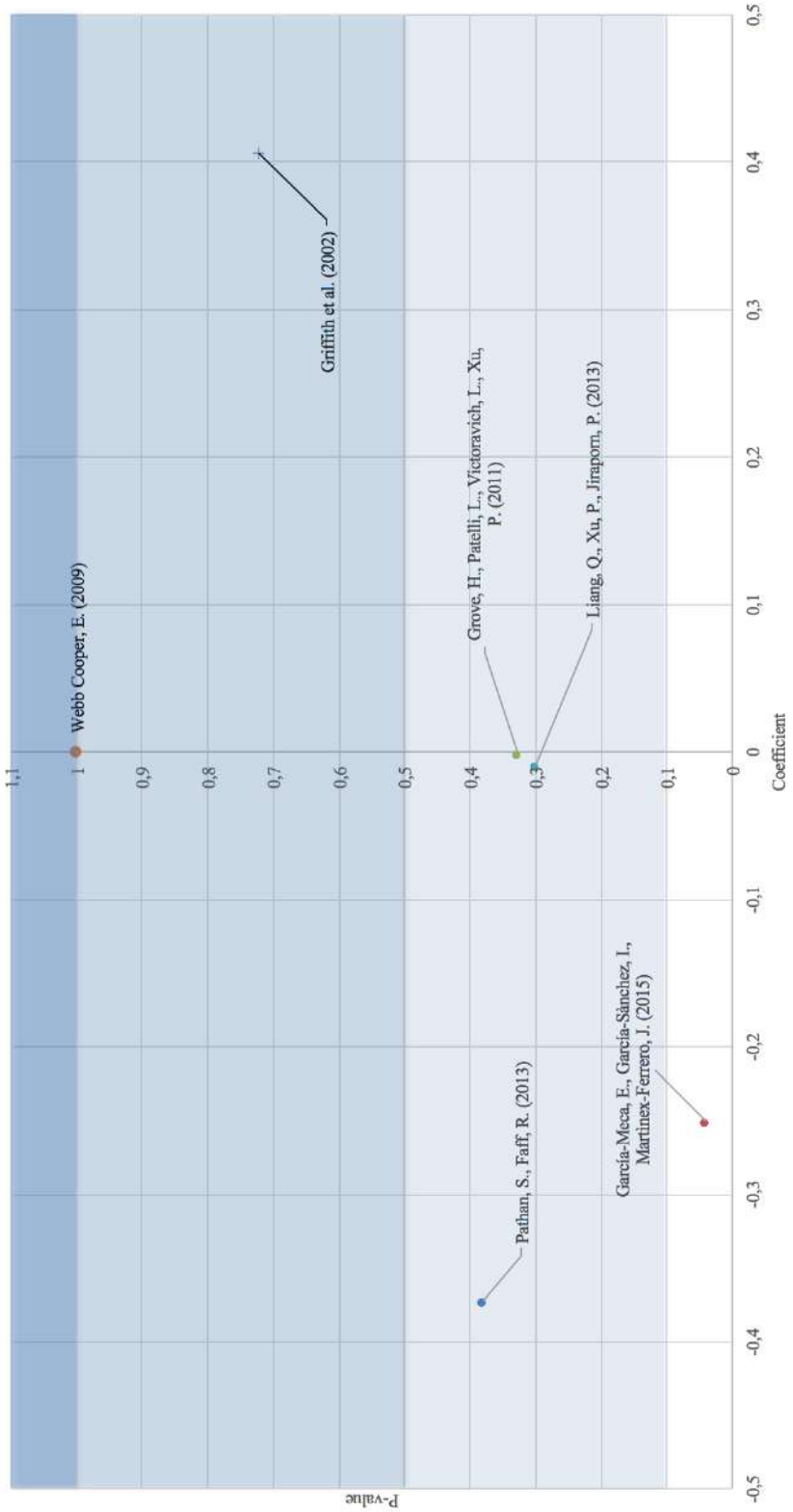

Figure 1.12. CEO duality and performance
Authors' own elaboration

Publication	Sample	Period	Setting	Method	Performance indicator	Sign	Significance
García-Meca, Emma, Isabel-María García-Sánchez, and Jennifer Martínez-Ferrero. "Board diversity and its effects on bank performance: An international analysis." Journal of Banking & Finance 53 (2015): 202-214.	159 banks	2004-2010	International	GMM	Tobin's Q	-	***
Pathan, Shams, and Robert Faff. "Does board structure in banks really affect their performance?." Journal of Banking & Finance 37.5 (2013): 1573-1589.	300 BHCs	1997-2011	USA	OLS	Pre-Tax Operating Income; ROAA; ROAE; Net Interest Margin; Tobin's Q; Average stock Return	-	
Liang, Qi, Pisun Xu, and Pornsit Jiraporn. "Board characteristics and Chinese bank performance." Journal of Banking & Finance 37.8 (2013): 2953-2968.	50 banks	2003-2010	China	OLS	ROE	-	*
Cooper, Elizabeth Webb. "Monitoring and governance of private banks." The Quarterly Review of Economics and Finance 49.2 (2009): 253-264.	293 banks	2006	USA	DEA	CAMELS rating	+	
Grove, Hugh, Patelli, L., Victoravich, L., Xu, P. "Corporate Governance and performance in the wake of the financial crisis: Evidence from US commercial banks." Corporate Governance: An International Review 19.5 (2011): 418-436.	236 commercial banks	2005-2008	USA	4-Factor	ROA	-	
Griffith, John M., Lawrence Fogelberg, and H. Shelton Weeks. "CEO ownership, corporate control, and bank performance." Journal of Economics and Finance 26.2 (2002): 170-183.	100 banks	1995-1999	USA	Random effects	MVA; Tobin's Q; EVA	-	

Figure 1.13. CEO duality and performance
Authors' own elaboration

1.4.4 Diversity

A widely researched question in Corporate Governance literature is whether diversity among board members affects firm performance.

Diversity on boards should improve independence, preserve minorities' rights, and offer different point of views in boards' meeting. Nonetheless, it may slow down board functioning and decision provisioning (Carter et al., 2003, 2010). Hence, literature concerning this topic is not univocal. Moreover, it recognises that also the type of diversity seems to be crucial (Garcia-Meca et al., 2015). In particular, most of the studies focus on gender diversity and investigate whether a higher number of women directors can lead to better upshots in terms of effectiveness and performance. From an agency theory perspective, a higher number of women on the board improves independence and board monitoring function (Carter et al., 2003; Terjesen et al., 2009).

An extensive review of diversity on corporates' board is provided by Nielsen and Huse (2010), contrariwise, banking literature concerning diversity is limited and more recent. The only studies that investigate different types of diversity in banks' board are Hagendorff et al. (2010) and Garcia-Meca et al. (2015). In particular, Hagendorff et al. (2010) find that diversity (and independence) matter only under strict banking regulation regimes. In particular, the authors find that age, occupational and expertise diversity improve acquisition performance. Contrariwise, in less strict regulatory environments, Corporate Governance is virtually irrelevant in improving the performance outcomes of merger activities. Garcia-Meca et al. (2015) analyse the relationship between board diversity (interpreted as gender and as nationality) and performance on a cross-country sample composed by 159 banks observing the period 2004-2010. They find opposing results due to the type of diversity: gender diversity increases bank performance; national diversity constrains it. At last, they also assert that within weaker regulatory and lower investor protection environments board diversity has less influence on banks' performance. The effects of gender di-

versity on banks performance are also investigated by a few other researchers (Pathan and Faff, 2013; Strom et al., 2014; Nguyen et al., 2015) obtaining mixed results.

In particular, Pathan and Faff (2013) run a GMM estimation methods over a sample composed by 212 US BHCs and find that gender diversity has a positive effect on bank performance in the pre-Sarbanes–Oxley Act (SOX) period (1997–2002), but this relationship is becoming weaker in both the post-SOX (2003–2006) and the crisis periods (2007– 2011). They also argue that this finding may be resulted by the consequential possibility of a reduction of more capable male directors on board. This is consistent with Nguyen et al. (2015). The latters analyse the issue of gender diversity in 308 US banks from January 1999 to December 2011 by investigate the impact on market performance and controlling for executives' appointments announcements. As in Pathan and Faff (2013), the authors find that gender diversity is not linked to measurable value effects.

Contrariwise, Strom et al. (2012) find that a female CEO and a female Chair of the board are positively related to performance of a cross-country panel of 329 microfinance institutions in 73 countries during 1998– 2008.

As resulted by the survey conducted in this paper, gender diversity is also being investigated to explore its effects on bank risk-taking (De Cabo and Gimeno, 2012; Berger et al., 2014) and functioning (Muller-Kahle and Lewellyn 2011; Beck et al., 2013; Chakrabarty and Bass, 2014).

De Cabo and Gimeno (2012) investigate whether gender diversity impact on bank risk-taking of a sample composed by 612 European banks. In particular, the authors show three main findings: (i) a higher number of women directors reduces bank risk-taking; (ii) board size and woman directors number are positively related; (iii) banks with growth objectives are more prone to include women on their board. Berger et al. (2014) use a difference-in-difference estimation method to explore the relationship between different Corporate

Governance characteristics (age, gender, educational composition) and bank risk-taking, measured by the Risk Weighted Assets density (RWA/Total Assets). Their findings show that a higher representation of women on boards improves bank risk-avoiding, although results are not strongly significant. Furthermore, they argue that the latter result can be explained by a women risk aversion hypothesis.

Muller-Kahle and Lewellyn (2011) try to asses a relationship between board composition and subprime lending, by investigating also gender diversity issues on a sample of 74 US banks during the period 1997-2005. For what concerns gender diversity, their results show that subprime lenders have boards presenting a lower percentage of women directors. Beck et al. (2013) explore a similar research question but focus to loan officers rather than bank executives. The authors use data of a commercial bank in Albania and find a lower likelihood to turn problematic of loans originated by female loan officers than loans originated by male loan officers. Thus, loans screened and monitored by female loan officers present lower default rates. The authors confer this result to a better capacity of women to build relationship with borrowers better than male officers. At last, Chakrabarty and Bass (2014) investigate data of 280 International microfinance institutions, to asses whether a higher presence of women on boards may reduce banks' operating costs. Their results confirm the hypothesis of a positive effect of women on boards and lead the authors to argue that microfinance institutions with high operating costs may benefit from appointing a board with socio-economic expertise and women directors.

Standard setters started to promote diversity on board in the last decade. In 2011 the OECD announced its Gender Initiative which suggests *"The need to introduce quotas for women in boardrooms or in senior management is being widely debated and, conditional on data availability, deserves further analysis to understand its benefits in terms of women's employment outcomes and firm performance."* For what concerns banks board composition, the BCBS (2015)

provides specific suggestions regarding diversity, that are outlined in Principle 2: *"The board should be comprised of individuals with a balance of skills, diversity and expertise, who collectively possess the necessary qualifications commensurate with the size, complexity and risk profile of the bank."* From an Institutional perspective, gender diversity issue is being debated since 2007, and the discussion regarding this topic is still open. On 21st November 2007, the Committee of Ministers adopted the Recommendation CM/Rec(2007)17 of the Committee of Ministers to member states on gender equality standards and mechanisms provided by Council of Europe provide the that among the other suggestions regarding gender diversity, supports the *"adoption/existence and implementation of legal and administrative measures to promote women's equal participation in economic decision making, including implementation of plans for gender balanced participation in boards and other decision-making structures of economic and financial institutions and private enterprises"*.

Moreover, the European Parliament (EP) has called for action on gender gaps in economic governance (EP, 2012). In particular, the EP provide a resolution called for the EC to narrow the gender gap in the membership of European corporate management boards. Legislative frameworks have also been developed at a national level. Within the member States of the EU the development of a legislatives framework improving female representation on boards have been provided in: Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Spain and the Netherlands (Davies, 2011; EC Network, 2011; Pande and Forde, 2011; Visser, 2011) with some differences regarding companies targeted, proportion of minority gender to be represented, timetable for implementation, sanctions for non- compliance (EP, 2012). Moreover, a provision recommending more *"diversity"* in German managing and supervisory boards has lately been included in the German Corporate Governance Code, encouraging the appointment of women and foreign managers to management and supervisory boards (OECD, 2017). Furthermore, non-European Union

countries which provided similar legislative frameworks are: Norway, Iceland, Switzerland and Israel. Concerning financial institutions, in 2011, the Committee on Economic and Monetary Affairs provided a report on the Corporate Governance of financial institutions to suggest to European Commission an increase of female representation on financial institutions' boards by arguing that *"greater diversity would tend to reduce the sector's vulnerability to crises, contribute to stability, and improve the quality of debate and decision making."*

Moreover, the EC considers the diversity on financial institutions boards since the original proposal to strengthen the regulation of the banking sector, replacing Capital Requirements Directives (2006/48 and 2006/49) to the last developed Capital Requirements Directive (Directive 2013/36/EU, also known as CRD IV) which reports in the latter version that: *"The lack of monitoring by management bodies of management decisions is partly due to the phenomenon of 'groupthink'. This phenomenon is, inter alia, caused by a lack of diversity in the composition of management bodies. To facilitate independent opinions and critical challenge, management bodies of institutions should therefore be sufficiently diverse as regards age, gender, geographical provenance and educational and professional background to present a variety of views and experiences. [...] More diverse management bodies should more effectively monitor management and therefore contribute to improved risk oversight and resilience of institutions. Therefore, diversity should be one of the criteria for the composition of management bodies. Diversity should also be addressed in institutions' recruitment policy more generally. Such a policy should, for instance, encourage institutions to select candidates from shortlists including both genders."* As a result, the view point of a need to improve and preserve diversity on boards is shared by both standard setters and regulators and is also in line with most of the papers surveyed in this research. However, even thought academics focus on diversity of corporates' boards since the last decade of XX century (Nielsen and Huse, 2010) forestalling both standard setters

and regulators, for what concerns financial institutions, the development of suggestions and guidance is receiving growing attention of standard setters and regulators along with academics findings.

1.5 Risk Management

Banks are in the business of taking risks. Moreover, bank board characteristics are a crucial factor of bank risk-taking (Rachdi et al., 2013).

Since the crisis, risk management function has received increasing attention due to its decisive role in risk-avoiding, that has been revealed to be insufficient and weak. Thus, banking regulatory bodies have responded, proposing long overdue principles of good Corporate Governance (McConnell, 2011).

In particular, National authorities have taken several measures to improve regulatory and supervisory oversight of risk governance at financial institutions so as to ensure sound risk governance through changing environments and tightening up on the roles and responsibilities of boards of directors. These measures include developing or strengthening existing regulation or guidance, raising supervisory expectations for the risk management function, engaging more frequently with the board and management, and assessing the accuracy and usefulness of the information provided to the board to enable effective discharge of their responsibilities (FSB, 2013).

The second pillar of Basel II identifies the role of the board as an integral aspect of risk management, therefore aligning the internal governance structure in the light of comprehensive risk management approach seemed like an immediate need. Two of the most important internal governance mechanisms which support the comprehensive risk management framework are the establishment of an independent Chief Risk Officer (CRO) and/or RM Committee that will have an oversight responsibility for all risks undertaken by the bank.

Aebi et al. (2012), using data on 573 US banks over the crises period (1st

July 2007 to 31st December 2008), investigate whether risk management-related Corporate Governance mechanisms, made banks perform better during the financial crisis of 2007/2008. In particular, they examine if the presence of a CRO in a bank's executive board and whether the CRO reports to the CEO or directly to the BoD, are associated with a better bank performance measured by buy-and-hold-returns and ROE, controlling for various Corporate Governance characteristics (CEO ownership, board size, and board independence). Findings reported in their paper show that banks, in which the CRO directly reports to the BoD and not to the CEO, performed significantly better in terms of both performance measures. A similar result is provided by Ellul and Yerramilli (2013). They explore the implication of a strong and independent RM to bank risk-taking and performance using a sample of 74 large US BHCs over the period 1995–2010. They construct a Risk Management Index (RMI), which is based on five variables related to the strength of a bank's RM (CRO Present, a dummy variable that identifies if the BHC has a designated CRO; CRO Executive, a dummy variable that identifies if the CRO is an executive officer; CRO-Top5, a dummy variable that identifies if the CRO is among the five highest paid executives; and CRO Centrality, defined as the ratio of the CRO's total compensation to the CEO's total compensation). The authors find that banks with a higher RMI value in 2006 performed better in the crisis period than others, and were also less risky. Their conclusions are supported by lower tail risk and lower level of NPLs for better risk-managed banks in 2006. Zagorchev and Gao (2015) use 41 factors of the RiskMetrics' Corporate Governance index (CG41) to examine how Corporate Governance affects US financial institutions over the period 2002-2009. The authors find a negative relationship between better governance and excessive risk-taking (proxied by non-performing assets and real estate non-performing assets). Moreover, their results also support a positive association between better governance and performance (measured by Tobin's Q). Keys et al. (2009) find that larger

relative power for the CRO (measured by CRO compensation divided by the amount of compensation given to the top five paid executives) implies lower default rates on loans (mortgages and home equity loans). Mongiardino and Plath (2010) investigate the role of independent directors in RM. According to this study risk governance requires (1) a dedicated board-level risk committee, of which (2) a majority should be independent, and (3) that the CRO should be part of the bank's executive board.

Based on a survey among 20 large banks, they find that only a small number of banks followed these guidelines in 2007. Most risk committees were not comprised of enough independent and financially knowledgeable members. Similarly, Kanagaretnam et al. (2010) examine auditor independence in the banking industry by analysing the relation between fees paid to auditors and the extent of earnings management through loan loss provisions. They find that especially relating to small banks, auditor fee dependence on the audit client is associated with earnings management via abnormal loan loss provisions. Thus, the authors also suggest to policymakers to contemplate new regulations in light of the banking crisis. A complementary view is provided by Barakat and Hussainey (2013) who recommend to enhance risk disclosures by establishing independent specialized national committees or task forces to monitor and advise Pillar 3 disclosures in banks.

As a matter of fact, academic literature still presents mixed result, furthermore, *"there exist fundamental risk-incentive mechanisms that operate in exactly the opposite direction"* (Boyd et al., 2005). Furthermore, the diversity among financial system institutions lead to different risks faced by banks, supporting the unlikeliness to apply a single instrument of financial stability policy (Ellis et al., 2014).

In order to assess the progress of national authorities and the banking industry in the area of risk governance since the global financial crisis, the FSB issued a Thematic review on risk governance in February 2013 as part

of its series of peer reviews. The peer review found that financial institutions and national authorities have taken measures to improve risk governance. In particular, in the latter is argued that *"the board has ultimate responsibility for the firm's risk management, including setting the risk culture of the firm and overseeing management's implementation of the agreed business strategy. The board of directors sets the tone from the top, and seeks to effectively inculcate an appropriate risk culture throughout the firm."* Nonetheless, standard setters' attention and awareness to this issue is being given mostly since the early aftermath of the last financial crises. For example, OECD (2009) states: *"Perhaps one of the greatest shocks from the financial crisis has been the widespread failure of risk management. In many cases risk was not managed on an enterprise basis and not adjusted to corporate strategy. Risk managers were often kept separate from management and not regarded as an essential part of implementing the company's strategy. Most important of all, boards were in a number of cases ignorant of the risk facing the company."* EBA (2011) states that an institution shall develop an integrated and institution-wide risk culture, based on a full understanding of the risks it faces and how they are managed, taking into account its risk tolerance/appetite.

Assigning the role of risk management to a board-level committee is becoming more common among large companies, notably in the financial sector (OECD, 2017). From an Institutional perspective, the EP (2013) encourages Member States to introduce principles and standards to ensure effective oversight by the management body, promote a sound risk culture at all levels of credit institutions and investment firms and enable competent authorities to monitor the adequacy of internal governance arrangements. Finally, *"Member States shall [...] ensure that institutions have a risk management function independent from the operational functions and which shall have sufficient authority, stature, resources and access to the management body. Member States shall ensure that the risk management function ensures that all material*

risks are identified, measured and properly reported. They shall ensure that the risk management function is actively involved in elaborating the institution's risk strategy and in all material risk management decisions and that it can deliver a complete view of the whole range of risks of the institution." (CRD IV). However, more work is needed by both national authorities and banks to establish effective risk governance frameworks and to enumerate expectations for third-party reviews of the framework. Banks also need to enhance the authority and independence of CROs. National authorities need to strengthen their ability to assess the effectiveness of a bank's risk governance and its risk culture and should engage more frequently with the board and its risk and audit committees (BCBS, 2015). CEOs are key decision makers. In particular, their risk propensity has a decisive role in the definition of the strategy of the bank (Adams and Ferreira, 2007). As a consequence, their position has a strong effect on both bank risk and performance. However, empirical research on the impact of CEO duality on banks' risks (Simpson and Gleason, 1999; Pathan, 2009, Boujelbène and Nabila, 2011, De Jonghe et al., 2012, Rachdi et al., 2013; Cornelli et al., 2013) provide different conclusion and most of the findings are not supported by sufficient significance. Gender diversity is also being investigated to explore its effects on bank risk-taking (De Cabo and Gimeno, 2012; Berger et al., 2014) and functioning (Muller-Kahle and Lewellyn 2011; Beck et al., 2013; Chakrabarty and Bass, 2014).

Finally, as concerns risk management, Keys et al. (2009), Aebi et al. (2012) and Ellul and Yerramilli (2013) find that banks in which the Chief Risk Officer directly reports to the board of directors and not to the Chief Executive Officer performed significantly better in terms of both performance and risk measures. Mongiardino and Plath (2010) governance requires (1) a dedicated board-level risk committee, of which (2) a majority should be independent, and (3) that the CRO should be part of the bank's executive board.

Jurisdiction	Board responsibilities for risk management[*1]	Implementation of the internal control and risk management system[*2]	Board-level committee		Chief risk officers[*4]
			Risk management role of audit committee[*3]	Establishment of separate risk committee	
Argentina	C	C	L/R	C	C
Australia	C	C	C	C	
Austria	L/C	L	L*/C*	-	-
Belgium	L	L	L	-	-
Brazil	L	-[*5]	C	-	-
Canada			-		
Chile	C	C	-	-	-
China	L	L	C	-	-
Colombia	L	L	L	L	C
Czech Republic	C	C	-	-	-
Denmark	L	L	L		
Estonia			-		
Finland	C	C	C*	-	-
France	L		L		
Germany	L/C	L/C	L/C	-	-
Greece			C		
Hong Kong, China	C	C	C*	-	-
Hungary	C	C	-	-	C
Iceland			C		
India	L/R	L/R	L/R	R[*6]	-
Indonesia	L	L	L	L	L
Ireland	C	C	C	-	-
Israel	-	R	L*[*7]	-	L*[*7]
Italy	C	C	L	C	C*
Japan	L	L	-	-	-
Korea	C	-	-	-	-
Latvia	C	C	L	-	-
Lithuania	-	-	C*	-	-
Luxembourg			C		
Mexico	L	L	L	-	-
Netherlands	C	C	C*	-	-
New Zealand	C	C	-	-	-
Norway	C	L/C	L*	-	-
Poland	-	L/C	L*	-	-
Portugal	L[*8]	L[*8]	-	-	-
Russia	R/C	R/C	R/C	C	-
Saudi Arabia	C	L/C	-		
Singapore	C	R/C	C	C	C
Slovak Republic			-		
Slovenia	C	C	L	-[*9]	-
South Africa	C	C	C	C	C
Spain	L	L/C	L*/C*	-	-

Figure 1.14. Governance of internal control and RM
OECD (2017), Corporate Governance factbook

Jurisdiction	Board responsibilities for risk management*1	Implementation of the internal control and risk management system*2	Board-level committee		Chief risk officers*4
			Risk management role of audit committee*3	Establishment of separate risk committee	
Sweden	C	C	-	-	-
Switzerland	L	C	C*	-	-
Turkey	L	L	-	L	-
United Kingdom	C	C	C*	-	-
United States	R**10	L/R	L*/R**10	-	-

Figure 1.15. Governance of internal control and RM *(cont.d)*
OECD (2017), Corporate Governance factbook
L=requirement by the law or regulations R=requirement by the listing rule C=recommendation by the codes or principles "-"=absence of a specific requirement or recommendation

1.6 Ownership structure

Ownership structure is a widely researched topic in Corporate Governance literature (Shleifer and Vishny, 1986). The topic was initially introduced inspected by Berle and Means (1932), whose study points out the issue of the separation of ownership and control, being *"concerned with the survival of organizations in which important decision agents do not bear a substantial share of the wealth effects of their decisions"*[8]. They also discover that firms' performance is negatively affected by a diffuse ownership structure.

Concerning this issue, the agency theory (Jensen and Meckling, 1976) identifies managers as the agents whose function is to maximize shareholders' interests, recognised as principals. In a situation of separation between ownership and control, agents, who are not owners of the firm, may commit *'moral hazards'* since their interests are not aligned with those of principals (Jensen and Meckling, 1976). This view is consistent with Jensen (1983b) who also identifies two different solutions in order to solve principal-agency problems. One is to align principals and agents' risk-taking and the other is to enhance the monitoring of ownership structure. Indeed, agency theorists have

[8]Fama, Eugene F., and Michael C. Jensen. "Separation of ownership and control." Journal of law and economics (1983b): 301-325.

long considered concentrated ownership as a governance mechanism that may reduce agency costs (Glassman and Rhoades, 1980; Shleifer and Vishny, 1997). Nonetheless, the effect of the separation of ownership and control has been left undetermined and is still focus of debate.

In particular, researches related to ownership structure can be in turn divided in two different strands of literature. A first subfield deals in ownership concentration, the other is focused on owners' type. Concerning the first dimension, one of the studies who investigate the empirical relationship between ownership concentration and profitability in banks is Shehzad et al. (2010) which results show that concentrated ownership has a significant positive effect on bank risk-avoiding. Indeed, the authors, use a sample composed by 500 cross-country banks over the period 2005-2007 and find that a higher level of concentration lead to a reduction of NPLs ratio. Similarly, Adnan et al. (2011) investigate the efficiency of Malaysian listed banks during 1997-1998, trying to link it with banks' ownership structure. The authors, using a GLS multivariate regression, find that block ownership lead to better efficiency of Malaysian banks, as measured by both the ratios between NPLs and total loans and between operating expenses and total assets. They also justify this result by arguing that the significance of concentrated ownership could suggest better monitoring by the block-holders. This is consistent with Azofra and Santamaria (2011) who investigate Spanish banks. Lately, Grove et al. (2011) do not provide much support that concentrated ownership lead to positive effects on banks performance. Indeed, the authors find a weak association between the two variables. Contrariwise, Beltratti and Stulz (2012) show a strong relationship between concentrated ownership and bank risk-taking especially during the recent financial crisis in US. Following this view, Busta et al. (2014) focusing on data of European banks over the period 1993–2005, find a negative relationship between ownership concentration and banks market value. In particular, they use a GMM dynamic estimator that lead them to find a negative effect of

ownership concentration on banks Tobin's Q. Nonetheless, their major finding is that the obtained results varies across different institutional settings. Indeed, the negative effect is particularly strong in countries belonging to Germany, France or Common law legal tradition, contrariwise, the authors find a positive effect of concentration on Scandinavian banks. Busta et al. (2014) argues that these differences could derive by the identity of the predominant owners (financial institutions and family in the first group, trusts and foundations in Scandinavia).

Actually, as above mentioned, owners' type matter. The first study resulted by the research conducted that is related on this issue is Saunders et al. (1990). The authors show that stockholder controlled banks exhibit significantly higher risk-taking behaviour than managerially controlled banks during the 1979-1982 period of relative deregulation. Lately, Anderson and Fraser (2000) investigate whether or not managerial shareholdings affect banks risk-taking of an International sample observed in the period 1987-1994. Their results show a strong a positive observation of the analysed variables, although they present some differences in the period 1980s, due to the financial distress and the less level of bank regulation. This is also in line with Chen et al. (1998), arguing that as managerial ownership increases, the level of risk-taking decreases. Consistent are also Anderson and Fraser (2000) and Kabigting (2011). The latter finds that insider ownership has significant positive relationship with ROA, bank size and Earning Per Share (EPS). Lee (2002) uses a sample of 65 US BHCs observed over the period 1987–1996. His results show a negative relationship between risk (measured by the probability of failure) and shareholding of managers. Westman (2011) inspects a sample composed by 477 European traditional and non-traditional banks over 2000–2006 and finds directors' ownership positively affecting traditional banks profitability, whereas management ownership has a similar effect in non traditional banks sample. At last, Berger et al. (2012) by looking for a relationship between different Corporate Governance drivers and

US commercial banks risk, provide evidence that banks' probability of default is strongly and negatively affected by insider ownership. Fahlenbrach and Stulz (2011) find that higher insider ownership and higher sensitivity of CEO wealth to bank performance represent better alignment of interests. Indeed, there is a strand of literature regarding banks ownership, trying to asses specifically the association of CEO ownership and bank efficiency, obtaining mixed results. For instance, Pathan (2009) find statistically significant and positive coefficients regressing bank risks (total risk, idiosyncratic risk and systematic risk) over CEO ownership percentage. This result can be justified by showing that as the percentage of bank CEOs shareholdings increase, their risk preferences coincide with bank shareholders and so increases bank risk. Berger et al. (2012) find that high shareholdings of CEO, lead to a reduction of banks probability of failure. This is also consistent with Aebi et al. (2012). Contrariwise, Griffith et al. (2002) investigate the association of CEO ownership and bank performance (measured by EVA, Tobin's Q and MVA), applying a random effects model on sample composed by 100 BHCs over the period 1995-1999. Conversely to Pi and Timme (1993), the authors find a non-linear relationship between CEO ownership and performance. Rachidi et al. (2013) find that a lower CEO ownership has no significant effect with all measures of risks.

Another dichotomy concerning ownership structure, is related to state owned banks and private sector institutions. As resulted by this survey, many authors investigated this issue in the last decade. Berger et al. (2005) explore the effects of domestic, foreign, and state ownership on bank performance of Argentinian banks during 1990s. The authors obtained strong and robust result showing that state owned banks have poor long-term performance (static effect), those undergoing privatization had particularly poor performance beforehand (selection effect), and these banks dramatically improved following privatization (dynamic effect). Similar results are obtained by Kim and Rasiah (2010) by exploring a sample of Malaysian banks. Barry (2011), investigate

this issue in a sample of European banks and find that publicly held banks do not affect risk-taking when changes in ownership structure occur. Focusing also on a sample of European banks Iannotta et al. (2013) and try to relate state ownership with bank risk as measure by default risk and operating risk. They analysis show different results, one of the most relevant is that government owned banks resulted to face lower default risk, but higher operating risk. Altunbas et al. (2001) assess the impact of ownership structure of the efficiency of German banks finding no agency problems for non private banks operating within German banking market.

Recent studies investigate the relation between institutional shareholding and bank risk-taking with results again not conclusive. Barry et al. (2011), Erkens et al. (2012), Cheng et al. (2012) and Ellul and Yerramilli (2013) show that that financial firms greater institutional ownership is associated with increases in risk-taking strategies of banks. Contrariwise, Knopf and Teall (1996), Booth (2002), Ferri (2009) and Cebenoyan et al. (1999) report opposing findings, and this difference may be linked with the period of observation. Finally, a few studies assess the impact of regulation on banks ownership structure. In particular, Caprio et al. (2007) and Laeven and Levine (2009a; 2009b) investigate this issue and find evidence that bank regulation may increase or decrease bank risk-taking, depending upon the ownership structure. Levine (2004) and Barth et al. (2004) argue that regulation policies may limit the impact of traditional governance mechanisms. The authors also point out that Governments in many countries restrict the concentration of bank ownership and also impose limits on the purchase of shares by outsiders without regulatory approval.

In those companies with concentrated ownership structures, *"horizontal"* agency problems that arise between controlling and minority shareholders are the predominant concern, while *"vertical"* agency problems that arise between managers and shareholders may be mitigated (Vermeulen, 2013).

Indeed, in the last decade, even countries characterised by dispersed ownership structures, have introduced special arrangements to address the *"horizontal"* agency problems that can arise between controlling and minority shareholders (OECD, 2017) (Table 1.3 and 1.4). As a result, still there is not a clear answer about which is the optimal ownership structure in banks.

1.7 Compensation

Executive compensation is a hot subject for researchers especially in the aftermath of 2007/2008 financial crises (OECD, 2015). Indeed, there is a wide consensus in the literature regarding executive compensation that its level and composition may increase the risk-taking behaviour of bank managers (Houston and James, 1995; Adams and Mehran, 2003; Webb, 2008; Bebchuk et al., 2010; Gropp and Kohler, 2010; John et al., 2010; Grove et al., 2011; Cheng et al., 2012; DeYoung et al., 2013; Chaigneau, 2013). This is the reason why both principle setter and regulators identify it as a critical issue in banks' soundness and stability. Moreover, executive compensation has also become a topic of intense debate among principles setters (e.g. OCSE, 2015; 2017; BCBS, 2015; EBA, 2015), regulators (e.g. EP, 2013) and media (e.g. Rajan, 2008; Rajan et al. 2008; Kyrkpatric, 2009), with a particular focus on CEO compensation (Bai and Elyasiani, 2013; Chen et al. 2006; Fahlenbrach and Stulz, 2011; Thanassoulis, 2011; Hagendorff and Vallascas, 2011; Tian and Yang, 2014) Remuneration structure, and in particular, executive compensation, is one of the most debated topic in Corporate Governance literature of both firms and financial institutions. Also principle setters discuss about this subject in detail defining remuneration as a practice supporting Corporate Governance soundness (OECD, 2004; 2015; BCBS, 2010; 2015). Moreover, to achieve soundness it is emphasised that remuneration policy should be focused on the longer run interests of the company over short term considerations (OECD,

Table 1.3. Ownership structures at company level

Country	Ownership structure
Australia	A majority of shares in top 200 listed companies are in the hands of financial institutions, but their holdings are typically dispersed.
Austria	Direct ownership concentration is very high and prevalent in all size classes in Austria. In the largest 5% of companies the largest shareholder holds on average 67% of the equity.
Belgium	About 60% of listed companies have a shareholder who, alone or in concert, hold more than 30% of the voting.
Brazil	A large majority of listed firms are controlled by a single shareholder, foreign firms or via pyramidal structures involving corporate groups. Over 70% of the firms had either family or shared ownership control.
Canada	About 25% of the largest 300 TSX listed-firms have a controlling shareholder.
Chile	As of 2002, some 50 major conglomerates had ownership control of more than 70% of non-financial listed companies.
China	By the end of June 2016, there were 2,887 listed companies in China, 1,019 of which were state-controlled.
Colombia	Colombian companies have a highly concentrated ownership structure.
Czech Republic	The structure of ownership can be characterised by concentrated ownership usually in the hands of a controlling shareholder.
Denmark	Many large companies in the Nordic area have a dispersed ownership structure. However, a relatively large portion of the listed companies in the Nordic area have one or a few controlling shareholders.
Estonia	7 out of the 15 listed companies are in the hands of one controlling shareholder.
Finland	The ownership structure is decentralised in some companies, while others have shareholders with significant voting rights.
France	For all listed companies, the largest shareholder directly held 46% of the capital and 52% of the voting rights (1998-2002). Double voting rights were used by 36% of listed firms as a device of control-enhancing.
Germany	The ownership structure of listed companies is quite dualistic. While a significant number of enterprises are under tight control, in many cases, shares are broadly distributed.
Greece	Regarding the banking sector, listed banks are mainly characterised by dispersed ownership.
Hong Kong, China	About 75% of issuers have a dominant shareholder, for example, an individual/family or state-owned entity owning 30% or more of the issued shares (2012).
Hungary	Amongst listed companies, both concentrated ownership and dispersed structures can be found. The average size of the free-float is about 47%.
India	India is characterised by the widespread use of company groups, often in the form of pyramids with a wide basis and with a number of levels.
Indonesia	A survey of 186 listed firms found that on average 70% of the shares were held by controlling shareholders, and 58% of firms were family-controlled (2006-2007).
Ireland	Ireland have few family-controlled companies and widely dispersed ownership.
Israel	About 75% of listed companies are controlled by family or individual interests.
Italy	Nearly 2/3 of listed companies are controlled by a single shareholder. The presence of widely held companies is still limited. There is a sharp decline of the pyramid structure, shareholders agreements and non-voting shares in the last decade, possibly as a reaction to increasing market pressure.
Japan	Less than 10% of TSE listed companies have a shareholder with more than 50% of the shares. Approximately two-thirds of TSE listed companies have a shareholder with more than 10% of the shares.
Latvia	The majority of listed companies have concentrated ownership.
Korea	38 family-owned large company groups own 1 364 companies. Out of them, 213 are listed on the Korean stock market, and 51.8% of the total shares are owned by controlling shareholders.
Mexico	Listed companies are characterised by a high degree of concentration. Company groups are the common feature in the market, and many of them are owned by family groups.
Netherlands	The Netherlands has a more dispersed ownership structure than most continental European countries.

Authors' own elaboration on OECD (2017), Corporate Governance factbook

Table 1.4. Ownership structures at company level *(cont.d)*

Country	Ownership structure
New Zealand	New Zealand has few very large firms, and considerable parts of the largest firms are either government or co-operative owned, or controlled by offshore owners.
Norway	Among listed companies, 65% have a shareholder with at least a 20% stake, and 23% have at least 50% control.
Poland	30-60% of shares belong to the controlling shareholders and 15-20% is held by pension funds or investment funds.
Portugal	A key feature of the listed firms is the dominance of controlling (often family) shareholders. In 24 out of 53 listed companies, a single shareholder owns a majority stake.
Russia	About 43% of 96 major listed companies have an owner or a group of interrelated owners holding 75% of company shares in 2014 (Russian Institute of Directors survey, 2015-2016).
Singapore	The majority of listed companies in Singapore have a block shareholder holding of 15% or more. The ownership structure comprises two main types; companies that originally started off as (i) family-owned businesses and (ii) state owned enterprises.
Slovenia	Ownership of listed companies is concentrated as the principal three owners own on average 61% . The Government has significant direct and indirect control over a large number of sizeable companies in the domestic market.
South Africa	A majority of South African listed companies are characterised as having a controlling owner or shareholders.
Spain	In 35 listed companies (25,5% of the total) there is a controlling shareholder that holds the majority of voting rights. In 91 other listed companies (66% of the total), the sum of declared significant shareholdings, including shareholdings held by the Board, exceeds 50% of share capital, without any individual shareholder exercising control. Total free float climbed to 43,4% in 2015 (42,9% in 2014).
Sweden	The control to a large extent lies in the hands of domestic family groups, in different constellations, or other block holders. About 64% of listed firms have one shareholder with at least a 25% shareholding. State ownership is also quite significant.
Switzerland	Among the 20 SMI companies, 6 companies have one or more shareholders holding more than 15% of the voting rights in shares or in purchase positions as of July 4, 2016. With regard to medium and smaller companies, the share of controlling shareholders (25-30% of the shares) is higher.
Turkey	The majority of listed companies are in the form of family controlled financial/industrial company groups and there is a limited degree of cross-ownership within some company groups.
United Kingdom	The UK has a highly liquid listed company sector with dispersed ownership. In about 90% of companies listed on the LSE, there is no major shareholder owning 25% or more.
United States	Ownership of public companies is generally characterised by dispersed shareholdings. Listed companies are rarely under the control of a major shareholder but rather subject to managerial control. One study describes how most public corporations in the United States have large shareholders, by taking into account the ownership both of directors and officers and all large shareholders.

Authors' own elaboration on OECD (2017), Corporate Governance factbook

2004; 2015; BCBS, 2010; 2015). Referring in particular to financial institutions, BCBS asserts that remuneration structure is also linked to bank risk-taking behaviour[9], furthermore it should be in line with the business and risk strategy, objectives.

As a result of the survey conducted in this paper, executive compensation is a hot subject for researchers especially in the aftermath of 2007/2008 financial crisis. This is also denoted by academicians and principle setters. For example, OECD (2017) affirms that "since the financial crisis, much attention has been paid to the governance of the remuneration of board members and key executives".

Indeed, most of the literature regarding executive compensation in our sample was developed from 2011. Moreover, executive compensation has also become a topic of intense debate among principles setters (e.g. OCSE, 2015; 2017; BCBS, 2015; EBA, 2015), regulators (e.g. EP, 2013), and media (e.g. Rajan, 2008; Rajan et al. 2008), with a particular focus on CEO compensation.

Nonetheless, the evidence linking compensation practices to the effect on banks' risks and performance is mixed.

Focusing on an agency theory perspective, executive compensation and especially its variable part, is usually identified as one of the mechanism used to align managers' and shareholders' interests as well as to enhance executives' performance (Berle and Means, 1932; Holmstrom, 1979; Grossman and Hart, 1983; Murphy, 1985). Moreover, following this theory an executive compensation structure is optimal when managers are motivated to encourage only risk increasing but positive NPV projects (Jensen and Meckling, 1976; Amihud and Lev, 1981; Smith and Stulz, 1985).

From an opposite perception, the development of the literature outlines the managerial power theory that states that the composition of incentive pay

[9] *"Remuneration systems form a key component of the governance and incentive structure through which the board and senior management promote good performance, convey acceptable risk- taking behaviour and reinforce the bank's operating and risk culture"* (BCBS, 2015).

is perceived as a mechanism that misalign executives' interests from those of shareholders (Bebchuk et al., 2010). Indeed, as further investigated, there is a wide consensus in the literature regarding executive compensation that its level and composition may increase the risk-taking behaviour of bank managers. This is the reason why both principle setter and regulators identify it as a critical issue in banks' soundness and stability. In particular, it should include procedures to avoid conflicts of interest and should also encourages employees to act in the interest of the company as a whole. Moreover, incentives embedded within remuneration structures should not promote excessive risk-taking (BCBS, 2015). As noted above, a wide strand of the literature states that higher (potential) compensation in banking institutions lead to higher risk-taking behaviour (Houston and James, 1995; Adams and Mehran, 2003). Moreover, executives' incentives have also been identified as a driver of the recent financial crises of 2008 by several scholars (e.g., Kashyap et al., 2008; Kyrkpatric, 2009; Bebchuk et al., 2010).

Consistent with the managerial power theory, Cheng et al. (2012) investigate a sample of financial firms during the period 1990-2008 and find that banks posing higher compensation packages result to be riskier. Following this view, Gropp and Kohler (2010) show that in their sample consisting of 1100 banks from 25 OECD countries from 2000 to 2008, aligning the interests of managers and shareholders increases risk-taking of banks. Nonetheless, as a matter of fact, the most important determinant of the effect of compensation is its composition. Indeed, many of the studies resulted by this survey are consistent with the view that on the one hand equity linked pay encourages risk- taking, contrariwise non-equity linked pay makes CEOs more risk-averse.

As concerns equity linked CEO compensation, there may be a moral hazard behaviour since these practices combine unlimited upside with limited downside potential risk, resulting in convex CEO pay-off linkage with marginal increases in bank risk. DeYoung et al. (2013) find a rapid increase of equity-linked

compensation in US banking over the last decade and show that this practice is more linked with higher risk in financial institution than in any other industry. Moreover, the author state that CEO compensation was changed to encourage executives to exploit new growth opportunities created by deregulation and debt securitization, but this is also a reason to incur in an increasing risk-taking behaviour. In particular, banks' risk is measured by pay-performance sensitivity (delta), which is related to stock grants, and pay-risk sensitivity (vega), which is related to stock options grants. Findings of the authors asses that non-traditional banking income is strictly related to vega compensation.

Similarly, Bai and Elyasiani (2013) use CEO compensation sensitivity to risk (vega) and pay-share inequality between the CEO and other executives as measures of compensation. They aim to investigate the relationship between default risk and executive compensation for BHCs over the 1992–2008 period. Some of the most important findings deriving by their analysis are: CEO compensation sensitivity to risk of BHCs has risen in response to deregulation; higher CEO compensation sensitivity to risk lead to greater bank instability; the association between bank stability and managerial compensation is bi-directional; higher vegas induce greater risk and vice versa.

As mentioned above, regulating compensation structure is also a vital element in the risk-taking behaviour of bank executives. In particular, Webb (2008) states that executive bank risk-taking due to remuneration structure is largely avoided when regulatory monitoring is high. Hence, strict regulatory framework is needed to preserve bank stability.

Chaigneau (2013) analyses the effects of two regulatory mechanisms, namely a regulation of the structure of bank CEOs incentive pay and sanctions for the CEOs of failed banks, on bank risk-shifting. The author argues that the current regulatory approach, which largely attempts to align the interests of bank CEOs with those of their shareholders, is flawed. Moreover, Chaigneau (2013) also suggests that banks' Corporate Governance arrangements could

be well-adjusted into two alternative ways in order to ensure the efficiency structure of bank CEOs incentives. First, the regulator could let shareholders set both the level of pay and the level of incentives of bank CEOs, but it would impose some constraints on the structure of their incentive pay. Second, the regulator could threaten to punish the CEOs of failed banks. Any of these two mechanisms would ensure (at no extra cost) that bank CEOs have efficient risk-taking incentives, although argued that the first mechanism is more robust to modelling assumptions and parameter uncertainty.

Chen et al. (2006), investigate the relationship between stock option plans and risk-taking in the US banking industry. The authors study whether option-based executive compensation is linked to risk, measuring it with the volatility of prices. Their sample is composed by 68 banks involving 70 CEOs during 1992-2000 in US banking industry. Consistently with Bai and Elyasiani (2013), they also find a bi-directional causality between option based compensation and executives' risk-taking, indeed option plans induce more risk-taking, moreover riskier banks are also more likely to offer option based compensation. They also point out that stock option-based compensation increased as a result of deregulation. Their conclusions agree with John et al. (2010) that assess that regulators need to bear in mind a new paradigm providing the appropriate incentives/disincentives for risk-taking within compensation structure.

Different compensation policies provide different ways of aligning managerial and shareholder interests (Jensen and Murphy, 1990). Cunat and Guadalupe (2008) investigate the effect of product market competition on the compensation packages of banks' executives, distinguishing the effect on total pay, estimated fixed pay and performance-pay sensitivities, and the sensitivity of stock option grants. Using a panel data of US banks in 1990s, they provide a difference-in-differences estimation and find that deregulation has had a significant impact on the level and the structure of executives' compensation. In particular, the variable components of pay increased along with performance-pay sensitivities

and, at the same time, the fixed component of pay fell. Similarly, Mehran and Rosenberg (2008) report a significant impact of pay-risk sensitivity on risk-taking (measured respectively by volatility of stock returns and write downs).

Contrariwise, Fahlenbrach and Stulz (2011) find no evidence of the relationship between bank performance and both CEO incentives (and ownership) during the credit crisis, furthermore the poor performance of banks during the crisis was the result of unforeseen risk. The authors investigate a sample of 98 financial firms, of which 95 are banks over the period 2006-2008. In particular, they study whether US banks with CEOs, whose incentives were better aligned with the interests of their shareholders, performed better during the crisis. Their findings show that the banks in the sample performed worse both in terms of stock returns and in terms of ROE.

Closely to Fahlenbrach and Stulz (2011), Erkens et al. (2012) find that banks which performance was worse during the financial crisis are those offering non-equity based pay for their CEOs.

An unclear view of the association between executives' compensation and bank performance is given by Grove et al. (2011) and by Acrey et al. (2011). The first authors apply agency theory to the banking industry and adopt the factor structure by Larcker et al. (2007) to measure multiple dimensions of Corporate Governance for 236 US public commercial banks during the financial crisis. They investigate the effect of executive compensation on both banks' financial performance and loan quality, obtaining mixed result. Indeed, they find that the extent of incentive executive pay is positively associated with financial performance (measured by ROA of 2006 and 2007 and excess stock return of 2006), but it is negatively associated with loan quality (measured by the non-performing assets ratio of the average of the 2006–2008 period). They also capture the consequences of the mismatch between incentive systems and RM with a lack of risk adjusted financial targets in executive compensation.

From another perspective with similar results, Luo (2015) examines the determinants of executive compensation in Chinese banking during 2005–2012. The author runs both a 2 Squared Least Stages (2SLS) methods and a dynamic GMM regressions obtaining positive but no significant relationship with pay performance of CEOs although his result show that ownership structure (measured by ownership concentration and ownership identification) and compensation committee are significant in determining the amount of executive compensation.

Actually, a wide compensation practice is to link CEO payment to bank performance (Minnick et al., 2011). More specifically, this kind of cash bonus is usually payable when earnings-based targets over at least one year are achieved and the payoff increases up to a maximum cap. Harjoto and Mullineaux (2003) investigate compensation strategies of commercial BHCs during 1992–2000. One of their findings show that pay-for-performance sensitivities are strongly larger for BHCs that have entered the underwriting business. Furthermore, and consistent with agency theory, the authors find also that pay-for-performance sensitivities decline generally at BHCs as return variability increases. Continuing to follow an agency theory perspective, Cornett et al. (2009) look for a relationship between different Corporate Governance mechanisms and both bank earnings and earnings management by investigating data of the largest publicly traded BHCs in the US. During their analysis, they find that the estimation of the three variables was biased by high endogeneity. Thus, they continue their study by using a simultaneous equation approach and find that CEO pay-for-performance sensitivity, board independence, and capital are positively related to earnings and that earnings, board independence, and capital are negatively related to earnings management. In particular, as concerns pay-for-performance, the authors find interesting results: it is positively related to both earnings management and board independence, and the latter relationship is bidirectional. Also John et al. (2003) investigate the relation-

ship between pay-for-performance sensitivity of bank CEO compensation by using a sample composed by 143 BHCs over the period 1993-2007. Their analysis show that performance based compensation is negatively related to the leverage ratio and positively related to monitoring intensity by a bank supervisor and subordinated debt holders. Livne et al. (2011) investigate the role of Fair Value Accounting (FVA) outcomes in determining compensation amount of US bank CEOs, finding a positive link between CEOs cash bonus and fair value (FV) accounting of both Held For Trading (HFT) (managed for short-term profit) and Available For Sale (AFS) assets. Hagendorff and Vallascas (2011) investigate the link between CEO cash bonuses and bank risks by using the Merton distance to default model on a sample composed by US and European firms. They find that increases in CEO cash bonuses lower the default probability of banks. Moreover, the authors find also that the risk-reducing effect of CEO cash bonuses is mainly related to stronger regulatory environments and for non-distressed financial institutions. Similarly, Acrey et al. (2011) investigate the relationship between CEO compensation and bank default risk. They focus in particular on short term incentives to study if the latter could determine higher bank risk-taking. The authors use early warning off-site surveillance parameters and Expected Default Frequency (EDF) as well as crisis-related risky bank activities, and find that although compensation elements commonly thought to be the riskiest components (e.g. options and bonuses) are either insignificant or negatively correlated with common risk variables, and only positively significant in predicting the level of trading assets and securitization income. Contrariwise, Thanassoulis (2011) applying a theoretical model calibrated on US banking system data, demonstrates that overall remuneration represents a substantial expense for a bank which therefore contributes to default risk significantly. Lastly, the author suggests that cap on the proportion of the balance sheet which can be used for remuneration can lower bank default risk. Tian and Yang (2014) also focus

on incentive pay of US banking CEOs and find a positive association with bank risk-taking. In particular, they investigate a sample composed by 179 financial institutions over the period 2005-2010 and distinguish commercial banks from non-commercial financial institutions (respectively 123 and 56), and find a trend for commercial bank CEOs to switch from cash bonuses into other forms of incentive compensation, if more desirable. Bhagat and Bolton (2014) conduct a study on 14 of the largest financial institutions during 2000–2008. They focus different on features of CEO compensation (CEO's purchases and sales of their bank's stock, their salary and bonus, and the capital losses CEOs incur due to the dramatic share price declines in 2008) and consider three measures of risk-taking (Z-score, the banks' asset write-downs, and whether or not a bank borrows capital from FED bailout programs, and the amount of such capital). Their results agree with the analysis of Bebchuk et al. (2010) and assess the correlation between incentives generated by executive compensation programs and excessive risk-taking by bank. The authors also propose a compensation structure for senior bank executives: executive incentive remuneration should only contain restricted stock and restricted stock options. This kind of structure will properly fit the long-term incentives of the senior executives with the interests of the stockholders. Even though most of the literature regarding executives' compensation in banking is especially referred to CEOs, a few recent studies (Keys et al., 2009; Aebi et al., 2012; Ellul and Yerramilli, 2013) are focused also on Chief Risk Officers (CROs) compensation in order to determine whether risk managers' activity effectiveness is related to a high level of compensation. This is the reason why the latters are deeper reviewed in the above presented risk management section.

To sum up, both standard setters and regulators pay attention to executives' compensation, due to the need of concern and awareness regarding this issue. The ability of the board to effectively oversee executive remuneration appears to be a key challenge in practice and remains one of the central elements of the

Corporate Governance debate in a number of jurisdictions. Implementation of the OECD Principles thus remains a challenge (OECD, 2010). Indeed, the earlier attention of standard setters is given by OECD (2009) stating: *"Depending on the characteristics of the company, remuneration and incentive systems that should be the focus of board (and sometimes regulatory) oversight need to be considered broadly and not just focused on the chief executive officer and board members. [...] It should be considered good practice that remuneration policies are submitted to the annual meeting and as appropriate subject to shareholder approval."* and continuing with a suggestion to financial institutions: *"Financial institutions are advised to follow the Principles for Sound Compensation Practices issued by the Financial Stability Forum. [(2009)]"*. Focusing on banks, BCBS (2010) in the first edition of its Principles for Enhancing Corporate Governance developed suggestions regarding compensation and link compensation systems to both bank performance and risk. The Committee in the same year also provided the Compensation Principles and Standards Assessment Methodology[10] so as to *"guide supervisors in reviewing individual firms' compensation practices and assessing their compliance with the FSB Principles and Standards, and seeks to foster supervisory approaches that are effective in promoting sound compensation practices at banks and help support a level playing field."*

From an institutional perspective, the EC issued legislative proposals to grant shareholders the right to vote on remuneration policy and the remuneration report (EC, 2014). Moreover, the CRD IV approved by the EP in 2013 impose a cap on banking executives' incentives. Indeed, many jurisdictions have adopted rules on prior shareholder approval of equity-based incentive schemes for board members and key executives. More recently, EBA (2015) provide a draft of its Guidelines to set out the governance process for implementing sound remuneration policies across the EU and also aim to identify

[10]Compensation Principles and Standards Assessment Methodology, Basel Committee on Banking Supervision, January 2010.

specific criteria for mapping all remuneration components into either fixed or variable pay. At a national level, United Kingdom (2002) introduced a non-binding shareholder vote on executive compensation *"Say-on-Pay"*, which one of the main aims was to improve performance linkage of executive pay. This practice was also followed by US (2010) and Australia (2011). Furthermore, in UK new rules came into force in September 2013, where publicly traded companies are required to submit the company's remuneration policy report for a binding shareholder vote at least every three years. Figure 1.16 and 1.17 summarise National requirements or recommendations for board and key executives' remuneration.

To sum up, there has been a rich policy effort to entail firms, and especially banks to achieve a more long- term-oriented awareness regarding compensation structure and also a better-defined performance based view to reduce excessive risk-taking, as a response to the financial crisis.

1.8 Conclusion

The main findings of this paper lead to assert that there is an increasing understanding of the fundamentals of bank Corporate Governance such as board structure, committees, risk management, and ownership structure. This result stands out from both banking and institutional perspective. Indeed, authorities have developed several measures with the aim of strengthening risk management regulation, and assessing the accuracy and usefulness of information provided to and from banks' directors also by engaging more frequently with board and management. Notwithstanding this, standard setters and regulators tend to focus respectively on what the board should do and must do and the necessary competences of board members as opposed to structural characteristics (Basel Committee on Banking Supervision, 2010; FSB, 2013; Directive 2013/36/EU or CRD IV; Bank of Italy, 2008) (Brogi,

Jurisdiction	Remuneration policy		Level / amount of remuneration		
	Disclosure	Approval by shareholders	Disclosure		Approval by shareholders
			Total	Individual	
Argentina	L	SoP/AA	L	All directors	SoP/AA
Australia	L	L (Advisory)	L	Key management personnel	
Austria	C	SoP/AA	C	All members of the management board	SoP/AA
Belgium	L	L (Advisory)	L	L	L (Advisory)
Brazil	L	L (Binding)	L	Highest and lowest paid directors	L (Binding)
Canada	L	C (Advisory)	L	L	C (Advisory)
Chile	-	L (Binding)	-	Only for board members	L (Binding)
China	L	L	L	L	L
Colombia	C	C (Binding)*1	L,C	-	L (Binding) for directors C (Advisory) for execs
Czech Republic	L	L (Binding)	L	-	L (Binding)
Denmark	C	C (Advisory*)	L	C	L
Estonia	-	-	-	-	-
Finland	C	C (Binding*)	C	CEO and key executives	L
France	C	C (Advisory)	L	L	C (Total)
Germany	L	C (Advisory)	L	L	L (Advisory)
Greece	-	L (Binding)	L	-	L (Binding)
Hong Kong, China[*2]	R	-	R	Directors*	-
Hungary		L (Binding)			-
Iceland		L (Binding)	L	L	L (Binding)

Figure 1.16. Governance of internal control and RM
OECD (2017), Corporate Governance factbook

Jurisdiction	Remuneration policy		Level / amount of remuneration		
	Disclosure	Approval by shareholders	Disclosure		Approval by shareholders
			Total	Individual	
India	L/R	-	L*3	L*3	L (Binding)
Indonesia	L	L(Binding)	L	L	L(Binding)
Ireland	R	-		R	-
Israel	L	L (Binding)	L	Top 5	L (Binding*4)
Italy	L	L (Advisory)*5	L	L: directors, statutory auditors and general managers	L (Binding) for directors*6
Japan	L	SoP/AA	L	Above JPY 100 million	SoP/AA
Korea	L	L (Binding)	L	Above KRW 500 million	L (Total)
Latvia	C	L (Binding)	-	C	L (Binding) for directors
Luxembourg		SoP/AA			SoP/AA
Mexico	L	-	L	-	L
Netherlands	L	L (Binding)	L	L/C	L (or AA)
New Zealand	L	-	L	All directors and employees above NZD 100 000	
Norway	L	L (Binding*)	L	-	L (Binding)
Poland	-	-	L	-	-
Portugal	C	L (Binding)	L	All members of the board of directors and supervisory board	L (Binding)
Russia	L	-	L	C (all directors and CEO)	L (Binding) for directors
Saudi Arabia	L	-	L	All directors and top 5 key executives	-
Singapore	C	R (Binding) for directors	C	All directors, CEO and top 5 key executives	-
Slovak Republic	C	-	C	-	C
Slovenia	L	SoP/AA	L	L	-
South Africa	C	C (Advisory)	C	All directors	C (Advisory)
Spain	L	L (Binding)	L	All members of the management board	L (Binding)
Sweden	L	L (Binding)	L	All directors and CEO	L (Binding)
Switzerland	L/R	C (Advisory)	L	All directors and CEO	L (Binding)
Turkey	L	SoP/AA	L	C (Board members and all directors)	L (Binding) for directors
United Kingdom	L	L (Binding)	L	All directors	L (Advisory)
United States	L	L (Advisory)	L	All directors and CEO, CFO and 3 executive officers (≥ USD 100 000)	L (Advisory)

Figure 1.17. Governance of internal control and RM *(cont.d)*
OECD (2017), Corporate Governance factbook
L=requirement by the law or regulations, R=requirement by the listing rule, C=recommendation by the codes or principles "-"=absence of a specific requirement or recommendation

2011).

Nonetheless, there is still a lot of work to do to implement sound Corporate Governance. This paper examines the developments of bank Corporate Governance literature trying to shed some light on the causality dilemma between theory and practice, by investigating whether or not the progress of regulation and supervision in the area of bank governance follows academic findings or viceversa. There is a ong term supervisory perspective resulted by the investigation of the literature the purpose of banks' Corporate Governance is less to safeguard shareholders and investors, but to safeguard depositors and other debtholders.

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Chapter 2

Better safe than sorry

Will the single rulebook on bank CG prevent excessive risk taking?

Abstract: Conventional wisdom leads to assert that good governance may underpin bank performance while bad governance destroys stability/soundness. Moreover, strong externalities on the economy make bank Corporate Governance a fundamental issue. The European Commission pursued a number of initiatives to create a safer and sounder financial sector for the single market and to restore confidence in banks.

This set of rules is intended to build a single rulebook for financial intermediaries in the EU28. It is based on a three-pronged approach: prudential requirements for banks (Capital Requirements Directive/Regulation); prevention and management of bank failures (Bank Recovery and Resolution Directive); deposit insurance (to be completed).

In particular, the Capital Requirements Directive (CRD IV) imposing in addition to stricter capital requirements, introduces new Corporate Governance and remuneration rules. Bank board characteristics are a crucial factors in bank risk-taking (Rachdi et al., 2013), thus the qualitative and quantitative composition of the board imposed by the new regulatory framework is aimed at preventing/curbing excessive risk-taking. This calls for an in-depth investigation of the Corporate

Governance composition of European banks after the introduction of the new single rulebook, in order to fully understand if and how it fills the pre-crisis regulatory gaps.

Keywords: Corporate Governance, Banks, Regulation, Single rule book, Risk taking

2.1 Introduction

Banks exert a strong impact on economic growth (Levine, 1997; 2005; Hagendorff et al., 2007; Bøås, 2008). Effective Corporate Governance is critical to the proper functioning of the banking sector and the economy as a whole. Banks' safety and soundness are key to financial stability, and the manner in which they conduct their business, therefore, is central to economic health (BCBS, 2015). As a result, soundness of bank Corporate Governance is a crucial element not only for promoting a more resilient financial system (FSB, 2013) but also for sustaining economic growth (OECD, 2004; 2015).

Moreover, shortcomings in the governance of banks can result in the transmission of problems across the banking system and, if widespread, can destabilize the financial system (Levine, 2004; OECD, 2006; BCBS, 2015, EU, 2013). The recent financial crisis that started in 2007 and plagued the economy until the recent years, can be considered as *"a wake-up call"* and highlighted that insufficient attention was paid to bank governance (Ahrens et al., 2011; Adams and Mehran, 2012). Indeed, both academics and practitioners claim that shortcomings in bank governance may have played a central role in the development of the crisis (Kirkpatrick, 2009; Aguilera and Jackson, 2010; Adams, 2012; Aebi et al., 2012; Al-Sa-eed, 2012; Erkens et al., 2012; EC, 2013).

These strong externalities on the economy make bank Corporate Governance a fundamental issue. Therefore, a more comprehensive and deeper knowledge of specific features of bank Corporate Governance is crucial in order to identify the optimal framework to conduct an efficient risk management. As a matter

of fact, since the crisis, risk management function has received increasing attention due to its decisive role in risk-avoidance, that has been revealed to be insufficient and weak. Regulation calls for Boards of Directors and Committees that prevent the undertaking of excessive risk by financial institutions. Thus, it is not surprising that regulators and practitioners have responded, proposing long overdue principles of good Corporate Governance (McConnell, 2011).

Following the principles, national authorities have taken several measures to improve regulatory and supervisory oversight of risk governance at financial institutions, to ensure sound risk governance through changing environments and tightening up on the roles and responsibilities of boards of directors. These measures include the development and strengthening of existing guidance and regulation, raising supervisory expectations for the risk management function, engaging more frequently with the board and management, and assessing the accuracy and usefulness of the information provided to the board to enable effective discharge of their responsibilities (FSB, 2013).

The second pillar of Basel II identifies the role of the board as an integral aspect of risk management, therefore aligning the internal governance structure in the light of comprehensive risk management approach seemed like an immediate need. The European Commission pursued a number of initiatives to create a safer and sounder financial sector for the single market and to restore confidence in banks. This set of rules is intended to build a single rulebook for financial intermediaries in the EU28. This framework includes prudential requirements for banks (CRD/CRR), a better protection for depositors, and regulates the prevention and management of bank failures (BRRD).

In particular, the Capital Requirements Directive (CRD 4) encloses stricter rules on capital adequacy, as well as new Corporate Governance and remuneration rules. These latter are focused on the qualitative and quantitative composition of Corporate Governance actors (including rules on the number of directorships held by a director of a significant institution; new rules on risk

and nomination committees, board diversity), risk management, financial reporting, the responsibilities of the board and control of executive remuneration (including limits on the proportion of variable to fixed pay).

Finally, The European Banking Authority (EBA) has launched in October 2016 two public consultations: (i) to revise the existing Guidelines on internal governance, published on 27 September 2011, (ii) on the assessment of the suitability of the members of the management body and key function holders, jointly with the European Securities and Markets Authority (ESMA)[1].

Nonetheless, national authorities need to strengthen their ability to assess the effectiveness of a bank's risk governance and risk culture and should engage more frequently with the board and its risk and audit committees (FSB, 2013; BCBS, 2015; EC, 2013).

As a result, bank board characteristics are a crucial factor of bank risk-taking (Rachdi et al., 2013), thus the qualitative and quantitative composition of Corporate Governance imposed by the new regulatory framework and the effects on bank risk-taking is to be deeper analysed.

Lastly, the diversity among financial system institutions leads to different risks faced by banks, supporting the unlikeliness to apply a single instrument of financial stability policy (Ellis et al., 2014).

All of these issues call for a further exploration on the relation between Corporate Governance and bank risk taking in order to fully understand how the new Corporate Governance framework fills the pre-crisis regulatory gaps.

Both a qualitative and quantitative approach will be adopted. A first part of the research will consist in conducting a comprehensive literature review and a comparison of the differences between EU and US financial systems.

The quantitative approach will include descriptive statistics and an econo-

[1] *"Generally, these guidelines are expected to contribute to the development of single rule book and a level playing field for the EU banking and investment firm sectors and convergence of supervisory practices and outcomes. Being a joint initiative of EBA and ESMA, these guidelines are also expected to strengthen the consistency and reduce potential risk originating from regulatory arbitrage within the EU financial system".* ESMA (2017).

metric model with the double purpose of identifying the best practices in bank Corporate Governance and assessing whether the latter have already been recognized as crucial by the new regulatory framework.

2.2 Literature

There is a wide strand of literature exploring the relationship between Corporate Governance and bank risk-taking from different point of views. Nonetheless, a clear and univocal consensus about the best practice is still missing. Furthermore, the literature is mainly focused on US.

From a general perspective, Peni and Vähämaa (2012) find mixed results in searching for an association between better governance and risk reduction. More recently, Zagorchev and Gao (2015) show that good governance underpins risk avoiding of financial institutions.

An extensive strand of empirical literature shows that Corporate Governance of financial intermediaries is associated with financial and market performance (Caprio et al., 2007; Cornett et al., 2007; de Andres and Vallelado, 2008; Hanazaki and Horiuchi, 2003; Jirapron and Chintrakarn, 2009; Laeven and Levine, 2009; Macey and O'Hara, 2003; Mishra and Nielsen, 2000; Pacini et al., 2005; Sierra et al., 2006; Webb Cooper, 2009; Pathan and Faff, 2013; Adams and Mehnar, 2013). In particular, several studies observe the relation between bank risk taking and the most relevant features of Corporate Governance: board size, board independence, CEO duality, gender, compensation (including CEO compensation) and risk management.

With a specific focus on board size, Pathan (2009) and Minton et al. (2010) find that bank board size of US banks is negatively related to risk-taking (measured as total risk, idiosyncratic risk and systematic risk) during the pre-crisis period. This is also consistent with the study of Faleye and Krishnan (2010), Rachdi and Ameur (2011).

Contrariwise, Berger et al. (2012) argue that during the recent financial crisis board size, as well as other Corporate Governance characteristics of US commercial banks are not related to bank stability (measured in terms of probability of default). Split views concern also independence of board members and risk taking (Erkens et al., 2010; Yeh et al., 2011).

Literature about the relationship between bank governance and risk taking is effectively reviewed and summarized by Srivastav and Hagendorff (2016) as reported in Figure 2.1 and Figure 2.2. As a matter of fact, there is a noteworthy lack of univocal consensus about the relationship between Corporate Governance features and bank risk-taking.

This makes further research on this topic relevant and fascinating.

Additionally, the topic is contemporary since it deals with the assessment of a new regulatory framework of European financial intermediaries, and is to be analysed with an on-going concern perspective.

Lastly, this research is aimed at being original, since an early literature review conducted on these issues identifies a lack of an extensive analysis on European Corporate Governance data.

With the aim of deeply analising the above-mentioned issues, and driven by the existing literature, we are going to test the following hypothesis:

H_0: bank risk taking is influenced by corporate governance characteristics

2.3 Methodology

2.3.1 Sample

The sample of the analysis is composed by the 30 Euro Area banks listed in the Eurostoxx index (Table 2.1) all of which are significant entities supervised by the European Central Bank (ECB). Six of these banks are Systemically Important Financial Institutions (SIFIs) (Banco Santander, Banco Bilbao Vizcaya Argentaria, BNP Paribas, Deutsche Bank, Societe Generale and Unicredit).

Study	Governance measure	Summary
Board attributes		
Beltratti and Stulz (2012)	Shareholder-friendly board index collected by Institutional Shareholder Services (ISS)	• **Risk measures**: Default risk (Z-score); Equity risk (idiosyncratic component of stock volatility); Leverage risk (equity minus tangible assets scaled by assets); Portfolio risk (fraction of loan write downs to assets) • **Key findings**: Shareholder-friendly boards are positively associated with default risk, although this relationship is not entirely robust to different risk measures
Erkens et al. (2012)	Independent directors	• **Risk measures**: Default risk (expected default frequency); Equity risk (stock volatility); Leverage risk (amount of equity capital raised) • **Key findings**: No significant relationship between independent directors and default risk or equity risk. Banks with a higher fraction of independent directors reduced leverage risk by raising equity during the financial crisis.
Berger et al. (2014)	Demographics of executive directors (age, educational qualification, and gender)	• **Risk measures**: Portfolio risk (asset density, loan portfolio concentration) • **Key findings**: Portfolio risk is positively associated with younger executives and female directors. Portfolio risk is negatively associated with the fraction of directors with doctorate.
Minton et al. (2014)	Financial expertise of independent directors	• **Risk measures**: Equity risk (stock volatility); Leverage risk (risk-weighted capital ratio); Portfolio risk (fraction of loans secured by real estate) • **Key findings**: Boards consisting of higher amount of financial experts were positively associated with bank risk
International Monetary Fund (2014)	Board size Independent directors	• **Risk measures**: Default risk (Z-score and distance-to-default); Equity risk (systematic component of stock volatility); Tail risk (expected shortfall, marginal expected shortfall, and systemic risk) • **Key findings**: Higher fraction of independent directors is associated with lower bank risk, although boards that have more financial experts are associated with higher risk.
Executive pay		
Hagendorff and Vallascas (2011)	CEO pay-risk sensitivity or vega	• **Risk measures**: Default risk (Merton's distance-to-default) • **Key findings**: High vega banks pursue acquisitions that result in increasing default risk
DeYoung et al. (2013)	CEO pay-risk sensitivity or Vega CEO pay-performance sensitivity or Delta	• **Risk measures**: Equity risk (stock volatility) • **Key findings**: Higher vega is associated with an increase in equity risk. Higher vega results in shifting the business model of banks to non-traditional activities, i.e. a greater fraction of income from non-interest-bearing activities and derivatives investment.
International Monetary Fund (2014)	Fraction of equity-based pay	• **Risk measures**: Default risk (Z-score and distance-to-default); Equity risk (systematic component of stock volatility); Tail risk (expected shortfall, marginal expected shortfall, and systemic risk) • **Key findings**: Higher equity-based pay is associated with lower bank risk
Bennett et al. (2015)	CEO debt-based compensation	• **Risk measures**: Default risk (expected default frequency) • **Key findings**: Higher inside debt is associated with lower default risk during the crisis
van Bekkum (2015)	Fraction of CEO debt-based compensation	• **Risk measures**: Tail risk (value-at-risk, expected shortfall, covariance); Equity risk (stock volatility) • **Key findings**: Inside debt is negatively associated with different measures of bank risk
Bolton et al. (2015)	CEO inside debt to equity-based compensation	• **Risk measures**: Announcement effect on CDS spreads • **Key findings**: Announcement of CEO inside debt holdings is associated with lower CDS spreads
Cheng et al. (2015)	Residual compensation	• **Risk measures**: Equity risk (stock volatility) • **Key findings**: Residual compensation is positively associated with equity risk
Risk management		
Keys et al. (2009)	Risk manager power: Fraction of risk managers pay to top-5 executive pay	• **Risk measures**: Portfolio risk (default rates on subprime loans) • **Key findings**: Stronger risk management is associated with less risky subprime loan securitizations
Fahlenbrach et al. (2012)	Risk culture, as proxied by bank performance during the 1998 Russian crisis	• **Risk measures**: Default risk (bank failures during the 2007–08 period) • **Key findings**: Banks with persistent risk-taking culture performed poorly and were more likely to fail during the 2007–08 financial crisis
Ellul and Yerramilli (2013)	Strength and independence of risk management function	• **Risk measures**: Tail risk (expected shortfall); Credit risk (fraction of non-performing loans) • **Key findings**: Stronger Risk Management Index (RMI) is associated with lower tail risk exposure and better loan quality. RMI is also a strong predictor of bank tail risk exposures during the financial crisis
International Monetary Fund (2014)	Presence of risk committee	• **Risk measures**: Default risk (Z-score and distance-to-default); Equity risk (systematic component of stock volatility); Tail risk (expected shortfall, marginal expected shortfall, and systemic risk) • **Key findings**: Banks with risk committee are associated with lower risk-taking

Figure 2.1. Summary of prior literature on bank governance and risk taking
Srivastav and Hagendorff (2016)

Figure 2.2. Summary of prior literature on bank governance and risk taking *(cont.d)*
Srivastav and Hagendorff (2016)

The period of observation is 2008[2]-2016. The total market capitalization (as of July 2017) is 621 billion Euro and the Total Assets is approximately 15 billion Euro, representing almost 70% of Total Assets of banks subject to the Single Supervisory Mechanism (SSM) which amounted to 22 trillion euro at the end of the comprehensive assessment exercise[3] (2014). The top 5 banks in terms of Total Assets have Total Assets of almost 8 million Euro, representing more than a half the Total Assets of the total sample.

Considering the breakdown of sample by country, the top 5 countries in terms of aggregate Total Assets and total market capitalization are: Spain (that respectively has 5,113,650,635 and 258,768,458 thousand Euro – with 8 banks in the sample); France (3,434,332,000 and 95,324,674 – with 3 banks in the sample); Italy (2,153,512,832 and 93,374,069 – with 8 banks in the sample); Germany (2,070,996,000 and 43,010,945 – with 2 banks in the sample) and Netherlands (1,239,563,000 and 65,035,853 – with 2 banks in the sample).

Banks in the sample are classified by business model, using the Bureau Van Dijke variable *"Bank specialization"*, in respect of which the sample is composed by 24 Commercial banks, 3 Bank Holding Companies (BHC) and 1 Cooperative bank.

2.3.2 Model

We aim to study the effects of specific Corporate Governance characteristics on bank risk taking, analysing data from Corporate Governance reports, bank financial statements and stock market data.

Banks considered in the sample have different Corporate Governance models

[2]Except for ABN Amro and Bankia, which starting dates are respectively 2012 and 2011.
[3]European Central Bank (2014), Aggregate report on the comprehensive assessment, 26th October.

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
Loans	213,671,095	32,078,843	784,767,000	195,461,106	0.91
Gross loans	224,205,581	34,559,322	811,284,000	202,153,711	0.90
Less: reserves for impaired loans / NPLs	10,534,487	765,454	50,847,752	9,837,808	0.93
Other Earning Assets	243,512,885	8,381,019	1,524,729,000	348,230,968	1.43
Loans and advances to banks	57,270,085	814,000	484,927,000	100,526,520	1.76
Derivatives (assets)	70,951,044	194,704	859,582,000	140,110,592	1.97
Other securities	110,919,389	5,652,379	504,421,000	129,880,383	1.17
Remaining earning assets	5,965,400	792	115,054,000	19,026,425	3.19
Total Earning Assets	457,183,980	45,245,223	1,961,463,000	499,021,589	1.09
Fixed Assets	3,792,507	293,680	22,523,000	4,997,010	1.32
Non-Earning Assets	46,233,843	1,315,752	294,922,000	61,142,138	1.32
Total assets	507,210,330	48,271,811	2,164,103,000	557,760,993	1.10

Figure 2.3. Total Assets
Authors' own elaboration

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
Deposits & short term funding	279,462,684	27,935,188	1,111,246,000	272,906,532	0.98
Total customer deposits	192,947,107	16,175,810	763,595,000	190,587,392	0.99
Deposits from banks	70,025,800	1,175,000	344,921,000	78,340,960	1.12
Other deposits and short-term borrowings	38,186,850	63,687	134,512,000	35,788,125	0.94
Other interest bearing liabilities	151,292,840	2,046,899	1,250,333,000	211,050,007	1.39
Derivatives (liabilities)	66,047,212	12,986	838,817,000	137,871,935	2.09
Trading liabilities	33,195,939	3,000	235,757,000	43,703,246	1.32
Long term funding	54,690,274	145,000	212,176,000	54,890,531	1.00
Other (non-interest bearing)	47,095,413	193,000	375,943,000	87,946,040	1.87
Reserves	3,167,803	48,200	20,599,000	3,995,260	1.26
Equity	26,191,591	-6,055,991	102,699,000	25,488,747	0.97
Total liabilities & equity	507,210,330	48,271,811	2,164,103,000	557,760,993	1.10

Figure 2.4. Total Liabilities and Equity
Authors' own elaboration

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
Impaired loans (Memo)	18,573,110	909,043	80,005,187	16,069,762	0.87
Loan Loss Reserves (Memo)	10,534,487	765,454	50,847,752	9,837,808	0.93
Liquid Assets (Memo)	121,180,660	1,782,000	652,180,000	179,433,893	1.48
Intangibles (Memo)	4,536,465	69,407	30,401,000	6,454,502	1.42
Off Balance Sheet Items	102,499,525	1,443,000	1,001,467,000	171,396,870	1.67
Subordinated Debts (Memo)	8,486,318	42,000	33,782,000	8,253,871	0.97

Figure 2.5. Notes
Authors' own elaboration

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
Net Interest Revenue	6,541,499	542,675	32,812,000	7,041,145	1.08
Other Operating Income	5,120,014	89,691	41,490,000	6,096,443	1.19
Net gains (losses) on trading and derivatives	644,051	-2,312,000	6,855,000	1,291,471	2.01
Net gains (losses) on assets at FV through income statement	321,342	-2,332,000	5,549,000	894,695	2.78
Net fees and commissions	2,763,999	158,321	12,765,000	2,931,894	1.06
Remaining operating income	1,454,525	-4,725,000	34,994,000	3,366,442	2.31
Overheads	7,788,065	676,388	48,015,000	8,795,126	1.13
Loan Loss Provisions	2,413,516	114,000	18,549,000	2,952,262	1.22
Other	-719,700	-10,959,000	2,484,000	1,712,402	-2.38
Profit before Tax	740,231	-22,189,225	11,210,000	4,027,424	5.44
Tax	306,148	-2,996,614	3,718,000	973,401	3.18
Net Income	449,305	-19,192,616	8,115,000	3,350,147	7.46

Figure 2.6. Income Statement
Authors' own elaboration

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
Operating Income (Memo)	11,661,513	1,298,214	54,939,000	12,472,313	1.07
Dividend Paid	538,402	8,978	2,560,000	609,913	1.13
Total Capital Ratio	14,50	8,50	23,10	2,40	0.17
Tier Ratio	12,13	7,82	18,00	2,04	0.17
Total Capital	24,280,446	3,219,398	90,868,000	21,965,333	0.90
Tier Capital	19,874,694	2,663,833	80,944,000	18,526,694	0.93
Net-Charge Off	857,666	-4,373,543	16,583,000	2,560,487	2.99

Figure 2.7. Memo
Authors' own elaboration

(*traditional*[4] model, *dualistic*[5] model and *monistic*[6] model); the distribution of Corporate Governance models by banks is in Table[7] 2.1. With respect to the breakdown by Corporate Governance model, the most adopted model is the monistic one (by 15 banks in the sample, representing an aggregate amount of Total Assets of 9,077,576,901 thousand Euro and an aggregate amount of total market capitalization 395,094,853 thousand Euro); followed by the dualistic model (by 10 banks, with 4,656,809,646 and 179,543,662 thousand Euro) and

[4]In the *traditional* model (or *horizontal two-tier* model) the Shareholders' Meeting appoints both the Board of Directors and the Board of Statutory Auditors. The Board of Directors has the management and the supervisory functions; the Board of Statutory Auditors is in charge of the control function.

[5]In the *dualistic* model (or *vertical two-tier* model) the Shareholders' Meeting appoints the Supervisory Board (which has the control and the supervisory functions), that in turn appoints the Management Board (in charge of the management function).

[6]With the *monistic* model (or *one-tier* model) the company is governed by one corporate body. The Shareholders' Meeting appoints the Board of Directors, that undertakes both management and supervisory functions and selects among its directors the Internal Audit Committee, which has the control function.

[7]Where: BNP = BNP Paribas; DBK = Deutsch Bank AG; ACA = Credit Agricole SA; GLE = Societe Generale SA; SAN = Banco Santander SA; UCG = Unicredit SPA; INGA = ING Groep NV; BBVA = Banco Bilbao Vizcaya Argentaria SA; ISP = Intesa Sanpaolo SPA; KN = Natixis SA; CBK = Commerzbank AG; ABN = ABN Amro Group NV ; CABK = Caixabank SA; KBC = KBC Group NV; SAB = Banco Sabadell SA; EBS = Erste Group Bank AG; BKIA = Bankia SA; BMPS = Banca Monte dei Paschi di Siena; POP = Banco Popular Espanol SA; BIR = Bank of Ireland; BP = Banco Popolare Società Cooperativa; UBI = Unione di Banche Italiane; RBI = Raiffeisen Bank International AG; BCP = Banco Comercial Portugues SA; MB = Mediobanca SPA; BKN = Bankinter; EUROB = Eurobank Ergasias SA; BPE = Banca Popolare dell'Emilia Romagna SCARL; ALPHA = Alpha Bank AE; PMI = Banca Popolare di Milano SCARL.

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
Asset quality					
Loan Loss Res. / Gross Loans	5.98	0.90	26.37	4.51	0.75
Loan Loss Prov. / Net Int. Rev.	55.85	1.82	588.58	63.96	1.15
Loan Loss Res. / Non Perf. Loans	56.32	29.74	109.12	13.94	0.25
Non Perf. Loans / Gross Loans	11.33	1.77	53.29	9.22	0.81
NCO / Average Gross Loan	0.42	-2.70	21.45	1.93	4.59
NCO / Net Inc. bef. Ln Lss Prov.	17.58	-683.71	965.71	120.14	6.83
Impaired loans / Equity	110.24	-310.49	736.64	122.54	1.11
Unreserved impaired loans / Equity	47.99	-618.10	395.70	79.70	1.66
Capital					
Tier 1 Ratio	12.13	7.82	18.00	2.04	0.17
Total Capital Ratio	14.50	8.50	23.10	2.40	0.17
Equity / Total assets	6.23	-2.15	14.02	2.33	0.37
Equity / Net Loans	12.08	-4.52	25.26	4.48	0.37
Equity / Dep. & ST Funding	10.23	-3.21	29.64	4.31	0.42
Equity / Liabilities (CAR)	6.78	-2.22	16.31	2.67	0.39
Operations					
Net Interest Margin	1.67	0.39	3.35	0.66	0.39
Net Int. Rev. / Avg Assets	1.52	0.35	3.02	0.58	0.38
Oth. Op. Inc. / Avg Assets	1.11	0.15	6.01	0.57	0.52
Non Int. Exp. / Avg Assets	2.50	0.84	7.87	1.10	0.44
Pre-Tax Op. Inc. / Avg Assets	0.12	-6.25	3.58	0.98	7.99
Non Op. Items & Taxes / Avg Ast	-0.25	-6.54	1.27	0.78	-3.11
Return on Avg Assets (ROAA)	-0.13	-7.15	4.43	1.18	-9.38
Return on Avg Equity (ROAE)	-3.96	-596.31	322.87	57.42	-14.51
Dividend Pay-Out	36.08	-28.98	239.52	40.18	1.11
Non Op. Items / Net Income	-27.41	-651.06	718.61	141.53	-5.16
Cost to Income Ratio	64.52	24.12	104.68	12.41	0.19
Recurring Earning Power	0.98	-0.06	6.47	0.63	0.64
Liquidity					
Interbank Ratio	58.74	3.08	488.99	63.43	1.08
Net Loans / Total assets	54.99	13.91	79.66	16.17	0.29
Net Loans / Dep. & ST Funding	87.91	24.87	155.27	25.05	0.28
Net Loans / Tot. Dep. & Bor.	63.27	17.33	89.17	17.45	0.28
Liquid Assets / Dep. & ST Funding	28.56	3.20	97.99	23.94	0.84
Liquid Assets / Tot. Dep. & Bor.	19.12	3.06	69.05	14.73	0.77

Figure 2.8. Key ratios
Authors' own elaboration

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
MTB_31/12	0.64	-2.35	3.44	0.48	0.75
MTB_avg	0.65	-2.35	3.44	0.50	0.76
P/E_31/12	1.84	-14.03	37.66	5.44	2.96
P/E_avg	1.89	-12.50	41.98	5.98	3.17
LVG_ratio	0.13	-0.02	7.01	0.63	4.76
SD_ROA	0.98	0.00	13.45	2.39	2.44
Z_SCORE	22.16	-229.50	677.18	98.31	4.44
ln_ZSCORE	0.32	-5.09	6.52	2.36	7.49
LVGRisk	3.53	-0.77	73.49	13.78	3.90
ln_LVGRisk	-1.55	-7.24	4.30	2.04	-1.32
PortfolioRisk	18.63	-228.72	606.94	86.22	4.63
ln_PortfolioRisk	0.02	-6.51	6.41	2.48	122.32
Tobin_Q_31/12	0.35	0.00	1.01	0.41	1.17
TOBIN_avg	0.35	0.00	1.01	0.41	1.16

Figure 2.9. Performance and Risk variables
Authors' own elaboration

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
To Retirement	9.39	-1.90	20.30	3.67	0.39
In Role	3.86	-	8.30	1.70	0.44
Yrs on Board	5.26	0.10	13.20	2.37	0.45
In Organisation	6.48	-	15.20	3.29	0.51
Quoted Boards to date	3.25	1.30	8.30	1.47	0.45
Private Boards to Date	7.74	-	20.70	3.75	0.48
Quoted Boards currently	1.84	1.00	4.50	0.58	0.32
Private Current Boards	3.57	-	9.50	1.67	0.47
Avg. Yrs on Other Quoted Boards	3.24	0.40	6.90	1.49	0.46
Age (Yrs)	59.93	49.10	71.30	3.72	0.06
Education (No. of Qualifications)	1.72	0.50	3.10	0.57	0.33
Gender (% Male)	80.53	41.70	100.00	13.57	0.17
Nationality Mix	0.24	-	0.80	0.22	0.89
Succession Factor	0.37	-	1.00	0.15	0.40
Std.dev. of Time on Board (Yrs)	3.56	-	10.50	2.05	0.58
Std. dev. of Yrs in Organisation	5.38	-	14.90	3.72	0.69
Std. dev. of Quoted Boards to date	2.52	0.40	6.40	1.43	0.57
Std. dev. of Age (Yrs)	8.30	2.10	14.30	2.42	0.29
Std. dev. of Education (Qualifications)	1.09	0.30	2.10	0.33	0.30
Duality	0.05	-	1.00	0.21	4.57
Esecutivi	2.66	-	10.00	2.49	0.94
Esecutivi%	15.66	-	60.00	13.89	0.89
IND	9.86	-	24.65	5.94	0.60
IND%	59.78	-	100.00	28.40	0.48
SIZE_AUD	4.97	-	10.00	1.60	0.32
SIZEAUD%	0.31	-	0.67	0.11	0.37
AUD_MEET	12.84	-	53.00	10.38	0.81
SIZE_REM	4.48	2.00	9.00	1.46	0.33
SIZEREM%	0.27	-	0.71	0.13	0.48
REM MEET	7.91	-	28.00	4.60	0.58
SIZE_NOM	4.73	-	10.00	1.73	0.36
SIZENOM%	0.27	-	0.71	0.13	0.49
NOM MEET	6.71	-	25.00	4.70	0.70
SAYONPAY	0.37	-	1.00	0.48	1.29
GOLDEN_P	0.24	-	1.00	0.43	1.78

Figure 2.10. Corporate Governance - Supervisory Directors
Authors' own elaboration

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
Board Size	16.85	6.00	29.00	4.46	0.26
lnBORDSIZE	2.79	1.79	3.37	0.29	0.10
Number of Board Meetings	14.36	4.00	42.00	6.95	0.48
Audit Committee	1.00	1.00	1.00	-	-
Audit Committee Independence	81.67	25.00	100.00	21.77	0.27
Audit Committee Non-Executive Member	98.28	60.00	100.00	6.36	0.06
Nomination Committee	0.97	-	1.00	0.16	0.17
Nomination Committee Independence	74.54	-	100.00	25.61	0.34
Nomination Committee Non-Executive Member	94.97	-	100.00	11.91	0.13
Compensation Committee	0.97	-	1.00	0.18	0.18
Compensation Committee Independence	79.51	-	100.00	20.60	0.26
Compensation Committee Non-Executive Member	98.32	-	100.00	8.23	0.08
Corporate Governance Committee	0.45	-	1.00	0.50	1.10
CEO Board Member	0.55	-	1.00	0.50	0.90
Chairman is ex-CEO	0.20	-	1.00	0.40	2.01
Board Member Re-election Years	3.77	-	6.00	1.05	0.28
Corporate Governance	60.64	1.98	95.33	24.80	0.41
Equal-Weighted Rating	74.14	4.51	97.46	27.04	0.36
External Consultants	0.71	-	1.00	0.45	0.64
Succession Plan for Executives	0.64	-	1.00	0.48	0.75

Figure 2.11. Corporate Governance - Supervisory Directors *(cont.d)*
Authors' own elaboration

the traditional model (by 5 Italian banks, with 1,198,617,912 and 46,686,522 thousand Euro).

Even though we collected data for both Executive Board and Supervisory Board, we run the econometric model using data referred to the board in which the committees are estabilished, which is an information manually gathered from each banks' CG report. Descriptive statistics on all the collected data are provided are provided in Figure 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12 and 2.13.

The econometric model follows a two steps procedure:

1. **Factorial analysis.** Following an intensive data gathering process, we built a large database composed by more than 200 variables on market, financial statements and Corporate Governance data, as exposed in Annexes. The sources of collected data are: BVD, Boardex, Bloomberg, banks' financial statements and coporate governance reports. Thus, with

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
To Retirement	8.42	-12.10	18.60	5.14	0.61
In Role	3.87	-	13.70	2.63	0.68
Yrs on Board	6.21	0.10	26.90	4.50	0.73
In Organisation	11.68	-	31.60	7.53	0.64
Quoted Boards to date	3.09	1.00	10.00	1.83	0.59
Private Boards to Date	7.25	-	23.00	4.50	0.62
Quoted Boards currently	1.61	1.00	6.00	0.82	0.51
Private Current Boards	2.93	-	11.00	2.29	0.78
Avg. Yrs on Other Quoted Boards	2.99	-	9.30	1.77	0.59
Age (Yrs)	56.07	46.00	77.00	5.11	0.09
Education (No. of Qualifications)	1.80	-	4.00	0.71	0.40
Gender (% Male)	96.54	57.10	100.00	8.69	0.09
Nationality Mix	0.08	-	0.70	0.17	2.20
Succession Factor	0.22	-	0.60	0.14	0.64
Std.dev. of Time on Board (Yrs)	2.97	-	15.90	3.18	1.07
Std. dev. of Yrs in Organisation	3.90	-	16.00	3.95	1.01
Std. dev. of Quoted Boards to date	1.28	-	5.50	1.32	1.03
Std. dev. of Age (Yrs)	4.99	-	12.00	3.35	0.67
Std. dev. of Education (Qualifications)	0.63	-	3.10	0.54	0.87
Duality	0.05	-	1.00	0.21	4.45
Esecutivi	2.70	-	10.00	2.48	0.92
Esecutivi%	15.88	-	60.00	13.69	0.86
IND	10.05	-	24.65	5.96	0.59
IND%	60.88	-	100.00	28.28	0.46
SIZE_AUD	4.94	-	10.00	1.65	0.33
SIZEAUD%	0.31	-	0.67	0.12	0.38
AUD_MEET	13.07	-	53.00	10.56	0.81
SIZE_REM	4.42	-	9.00	1.50	0.34
SIZEREM%	0.26	-	0.71	0.13	0.49
REM MEET	8.05	-	28.00	4.68	0.58
SIZE_NOM	4.71	-	10.00	1.72	0.37
SIZENOM%	0.27	-	0.71	0.13	0.48
NOM MEET	6.83	-	25.00	4.75	0.70
SAYONPAY	0.39	-	1.00	0.49	1.25
GOLDEN_P	0.25	-	1.00	0.43	1.72

Figure 2.12. Corporate Governance - Executive Directors
Authors' own elaboration

	Average	Min	Max	Std. Dev.	Std. Dev. (%)
Board Size	16.87	6.00	29.00	4.48	0.27
lnBORDSIZE	2.79	1.79	3.37	0.29	0.10
Number of Board Meetings	14.53	4.00	42.00	6.93	0.48
Audit Committee	1.00	1.00	1.00	-	-
Audit Committee Independence	83.30	25.00	100.00	20.46	0.25
Audit Committee Non-Executive Member	98.19	60.00	100.00	6.51	0.07
Nomination Committee	0.98	-	1.00	0.16	0.16
Nomination Committee Independence	75.92	-	100.00	25.12	0.33
Nomination Committee Non-Executive Member	95.25	-	100.00	11.67	0.12
Compensation Committee	0.97	-	1.00	0.18	0.19
Compensation Committee Independence	80.87	-	100.00	19.61	0.24
Compensation Committee Non-Executive Member	98.30	-	100.00	8.39	0.09
Corporate Governance Committee	0.46	-	1.00	0.50	1.08
CEO Board Member	0.58	-	1.00	0.49	0.85
Chairman is ex-CEO	0.20	-	1.00	0.40	1.97
Board Member Re-election Years	3.73	-	6.00	1.03	0.28
Corporate Governance	60.32	1.98	95.33	25.19	0.42
Equal-Weighted Rating	73.54	4.51	97.46	27.60	0.38
External Consultants	0.71	-	1.00	0.46	0.64
Succession Plan for Executives	0.66	-	1.00	0.48	0.72

Figure 2.13. Corporate Governance - Executive Directors *(cont.d)*
Authors' own elaboration

the purpose of synthetizing all the information, we firstly run a Factorial Analysis, based on a Principal Component Analysis on Corporate Governance data. This process leads us to identify seven different "factors" that explain the pattern of correlations within our set of observed variables.

2. **Linear regression.** Then, we run a linear regression with an *"Enter"* method with the purpose of verifying the association of bank Corporate Governance assessment and risk taking, using the seven factors identified in step 1, among the other variables. The econometric model includes also control variables to adjust for the state of the economy (Economist Intelligence Unit (EIU), Overall Country Risk Rating) and banks size (natural logarithm of Total Assets).

1. ***Factorial analysis***

   (a) **Explaining the procedure.** The Factor Analysis has several ex-

Table 2.1. Sample description

Bank	CG model	BvD Ind	Country	EIU, Country Rating	Total Assets th EUR	Market cap th EUR
BNP	Monistic	A+	Spain	A	2,076,959,000	77,214,001
DBK	Dualistic	A+	Germany	A	1,590,546,000	31,288,878
ACA	Monistic	D	France	A	1,524,232,000	39,518,162
GLE	Monistic	A+	France	A	1,382,241,000	37,543,938
SAN	Monistic	A+	Spain	BBB	1,339,125,000	85,846,241
UCG	Trad.	A+	Italy	BB	859,532,774	35,121,432
INGA	Dualistic	A+	Netherlands	A	845,081,000	58,589,343
BBVA	Monistic	A+	Spain	BBB	731,856,000	48,655,568
ISP	Dualistic	A+	Italy	BB	725,100,000	40,696,212
KN	Monistic	D	France	A	527,859,000	18,262,574
CBK	Dualistic	A+	Germany	A	480,450,000	11,722,067
ABN	Dualistic	D	Netherlands	A	394,482,000	6,446,510
CABK	Monistic	B+	Spain	BBB	347,927,262	24,266,695
KBC	Monistic	A+	Belgium	A	275,200,000	28,283,590
SAB	Monistic	A+	Spain	BBB	212,507,719	9,693,477
EBS	Dualistic	A+	Austria	A	208,227,070	13,880,390
BKIA	Monistic	D	Spain	BBB	190,167,459	11,762,072
BMPS	Trad.	A+	Italy	BB	153,178,466	442,158
POP	Monistic	A+	Spain	BBB	147,925,728	1,330,404
BIR	Monistic	A+	Ireland	BBB	123,129,000	7,217,010
BP	Dualistic	-	Italy	BB	117,411,003	1,897,228
UBI	Dualistic	A+	Italy	BB	112,383,917	4,094,107
RBI	Dualistic	D	Austria	A	111,863,845	7,328,775
BCP	Dualistic	A+	Portugal	BB	71.264,81	3,600,152
MB	Trad.	A+	Italy	BB	69,818,605	7,472,029
BKN	Monistic	A+	Spain	-	67,182,467	-
EUROB	Monistic	A+	Greece	CCC	66,393,000	2,120,419
BPE	Trad.	A+	Italy	BB	64,957,028	2,077,327
ALPHA	Monistic	A+	Greece	CCC	64,872,266	3,380,702
PMI	Trad.	-	Italy	BB	51,131,039	1,573,576

Authors' own elaboration

traction methods for constructing a solution. We chose the Principal Components methodology for the extraction, in order to identify uncorrelated linear combinations of variables in our analysis. This is an iterative procedure that starts by finding a linear combination of variables (which will be named *"components"* or *"factors"*) that explains as much variation of the original variables as possible. It continues by finding other components that accounts for as much of the remaining variation as possible with the constraint to be

uncorrelated with the previous. Hence, the first factor explains maximum variance. The following factors explain progressively smaller portions of the variance and are all uncorrelated with each other. As a result, a small number of factors explain most of the variation, and can replace the original variables. In order to minimize the number of variables that have high loadings on each factor, we chose an orthogonal rotation method named *"Varimax"*. Missing values are handled chosing to exclude case listwise.

(b) **Variables selection.** We select Corporate Governance variables reported in Figure 2.3 - 2.13. Running the factorial analysis we notice that some variables (i.e. Gender % - the portion of male directors in the board) need to be excluded in order to maintain an optimal level of statistic significance. Finally, the selected variables result in the ones reported in Table[8] 2.2, with a P-Person correlation reported in Figure 2.14.

(c) **Running the analysis.** Firstly, we run two tests to detect the suitability of data for factorial analysis (Table 2.3): the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and the Barlett's Test. The first one indicates the proportion of variance among variables in database that might be caused by underlying factors. It's value is comprised between 0 and 1, and generally values higher than 0.5 indicate that factor analysis may be useful in summarizing original data. Bartlett's test of sphericity is used to test the hypothesis that the correlation matrix is an identity one. In fact, in this case, variables are unrelated and unsuitable for factorial analysis. Values of the significance level smaller than 0.05 indicate the usefulness of factorial analysis.

Then, we calculate the Total Variance explained by our model

[8]Where in the "Source" column CG stands for Corporate Governance Annual reports.

Table 2.2. Descriptive Statistics

Variable	Mean	Std Dev	N	Description	Source
YBoard	5.32	2.61	161	Time on Board for the individual at a selected Annual Report Date	Boardex
NQuoted	3.41	1.64	161	Number of Quoted Boards	Boardex
AVGY Quoted	3.38	1.61	161	The Average Time that a Director sits on the Board of Quoted Companies	Boardex
Age	60.31	3.74	161	Current age of selected individual	Boardex
Edu	1.74	0.59	161	The number of Qualification earned of selected individual	Boardex
Nationality	0.24	0.21	161	Portion of Directors from different countries at the Annual Report Date selected	Boardex
STDRole	3.46	2.20	161	Standard deviation of time on Board values for all the Directors	Boardex
Ind%	59.68	28.01	161	Portion of Indipendent Directors at the Annual Report Date selected	CG
Audit%	0.31	0.11	161	Portion of Directors of the Audit Committee related to Board Size	CG
AuditMeet	13.41	11.62	161	The number of meetings of the Audit Committee during the year	CG
Rem%	0.27	0.10	161	Portion of Directors of the Remuneration Committee related to Board Size	CG
RemMeet	8.04	4.70	161	The number of meetings of the Remuneration Committee during the year	CG
Nom%	0.29	0.10	161	Portion of Directors of the Nomination Committee related to Board Size	CG
NomMeet	6.77	4.55	161	The number of meetings of the Nomination Committee during the year	CG
Ln(Size)	2.82	0.28	161	The natural logarithm of the number of Directors seating on the Board	CG
BoardMeet	13.99	6.57	161	The number of Board meetings during the year	CG
AuditInd%	80.44	22.55	161	Portion of Independent Directors on the Audit Committee	CG
NomInd%	71.94	26.38	161	Portion of Independent Directors on the Nomination Committee	CG
RemInd%	79.73	20.15	161	Portion of Independent Directors on the Remuneration Committee	CG
CG Committee	0.47	0.50	161	Does the company have a Corporate Governance committee?	Boardex
CGSscore	63.45	23.99	161	The CG pillar measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long term shareholder value	Datastream
EW Rating	73.67	28.04	161	The Equal Weighted Rating reflects a balanced view of a company's performance in all four areas, economic, environmental, social and Corporate Governance	Datastream
STDAge	8.33	2.36	161	Standard deviation of the population of the ages of Directors for all the Directors	Boardex

Authors' own elaboration

(Figure 2.15) that is the amount of variance in the original variables accounted for by each factor. The % of Variance column shows the percentage of the variance accounted for by each factor to the total variance in all of the variables. The Cumulative % column shows the portion of variance accounted for by our seven extracted factors.

As shown in Figure 2.15, the first factor explains the largest portion of variance in the original variables, and the total variance explained by our model is almost 75% of variance in the original variables, which is a good result and lead us to reduce the complexity of the data set by using these seven factors, with less than 25% loss of information. In order to compute the portion of variance explained by each variable grouped in factors, we show the initial and the extracted values of communalities (Table 2.4). Each variable show a value of extraction communality higher than 0.5, which generally is the level of tolerance for significant results in the analysis.

Table 2.3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.652
Bartlett's Test of Sphericity	Approx. Chi-Square	2.123,34
	df	253.000
	Sig.	0.000

Authors' own elaboration

(d) We choose to synthetize original variables in seven factors, helped by the scree plot, that shows the eigenvalue of each component in the initial solution. The optimal number of factors to be extracted is the one with the eigenvalue higher than 1. We can notice a distinct break (that is in line with eigenvalus higher than 1) between the steep slope of the large factors and the gradual trailing of the rest (Figure 2.18). Figure 2.18 shows a steep downward slope for the first seven components. Once we identify the optimal number of factors, we use the Component Matrix (Figure 2.16) and the Rotated Component Matrix (Figure 2.17) to understand which are the original variables represented by each factor.

The latter shows the following composition of the seven factors:

- Factor 1: AuditInd%; RemInd%; Ind%; NomInd% (hence, this

	YBoard	NQuoted	AVGYQuoted	Age	Edu	Nationality	STDRole	Ind%	Audit%	AuditMeet	Rem%	RemMeet	Nom%	NomMeet	Ln(Size)	BoardMeet	AuditInd%	NomInd%	RemInd%	CGCommittee	CGSscore	EWRating	STDAge
YBoard	1.00																						
NQuoted	0.08	1.00																					
AVGYQuoted	0.19	0.38	1.00																				
Age	0.50	0.13	0.51	1.00																			
Edu	0.18	0.49	0.32	0.14	1.00																		
Nationality	0.10	0.47	0.21	0.09	0.38	1.00																	
STDRole	0.66	-0.21	0.30	0.41	0.08	0.06	1.00																
Ind%	-0.14	0.02	0.02	0.05	-0.16	0.02	-0.15	1.00															
Audit%	-0.11	-0.25	-0.24	-0.25	0.03	0.14	0.06	0.22	1.00														
AuditMeet	-0.27	-0.24	-0.04	0.05	-0.22	-0.36	-0.20	0.33	-0.24	1.00													
Rem%	-0.10	-0.04	-0.20	-0.28	-0.03	0.11	-0.11	0.34	0.63	-0.21	1.00												
RemMeet	-0.02	-0.27	0.06	0.20	-0.22	-0.27	0.10	0.02	-0.25	0.55	-0.28	1.00											
Nom%	-0.20	-0.03	-0.08	-0.28	-0.12	0.02	-0.17	0.42	0.53	-0.01	0.68	-0.17	1.00										
NomMeet	0.12	-0.13	0.16	0.19	-0.21	-0.00	0.19	-0.10	-0.09	0.11	-0.10	0.58	0.01	1.00									
Ln(Size)	0.01	0.11	0.09	0.02	-0.23	-0.26	-0.06	-0.05	-0.54	0.33	-0.47	0.16	-0.30	0.04	1.00								
BoardMeet	-0.26	-0.26	0.02	0.06	-0.16	-0.23	-0.06	0.01	-0.09	0.45	-0.02	0.52	0.03	0.43	0.06	1.00							
AuditInd%	0.10	0.07	0.04	0.22	-0.10	0.10	-0.06	0.68	-0.03	0.24	0.20	0.07	0.26	0.03	-0.10	0.01	1.00						
NomInd%	0.11	-0.07	0.17	0.33	-0.02	0.07	0.17	0.58	0.21	0.08	0.22	0.12	0.18	0.07	-0.30	-0.02	0.65	1.00					
RemInd%	0.09	-0.06	0.17	0.21	-0.05	0.07	0.08	0.58	0.11	0.20	0.10	0.09	0.25	0.01	-0.11	-0.05	0.62	0.77	1.00				
CGCommittee	0.06	0.20	0.28	0.26	0.10	0.47	0.20	0.13	-0.01	-0.18	0.03	-0.15	0.04	0.04	-0.06	-0.07	0.12	0.20	0.12	1.00			
CGSscore	0.21	0.04	0.17	0.29	0.14	0.20	0.29	0.13	0.01	-0.04	0.01	-0.11	0.07	-0.13	-0.10	-0.20	0.11	0.18	0.14	0.63	1.00		
EWRating	0.20	-0.03	0.20	0.22	0.22	0.09	0.33	-0.08	0.06	-0.10	-0.07	-0.15	-0.03	-0.21	-0.05	-0.27	-0.11	0.04	0.02	0.35	0.79	1.00	
STDAge	0.04	0.11	0.29	0.15	0.10	-0.02	-0.02	-0.02	-0.26	0.37	-0.21	0.22	-0.07	0.18	0.29	0.28	0.18	-0.01	0.11	-0.16	-0.28	-0.24	1.00

Figure 2.14. Correlation matrix
Authors' own elaboration

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.913	17.011	17.011	3.913	17.011	17.011	3.256	14.157	14.157
2	3.548	15.424	32.436	3.548	15.424	32.436	2.910	12.654	26.811
3	3.398	14.772	47.208	3.398	14.772	47.208	2.501	10.874	37.685
4	2.082	9.051	56.259	2.082	9.051	56.259	2.428	10.559	48.244
5	1.725	7.500	63.759	1.725	7.500	63.759	2.322	10.098	58.341
6	1.458	6.339	70.097	1.458	6.339	70.097	2.010	8.738	67.080
7	1.051	4.569	74.666	1.051	4.569	74.666	1.745	7.586	74.666
8	0.930	4.045	78.711						
9	0.680	2.956	81.667						
10	0.661	2.872	84.539						
11	0.593	2.578	87.118						
12	0.480	2.086	89.204						
13	0.409	1.777	90.981						
14	0.327	1.424	92.405						
15	0.300	1.303	93.708						
16	0.283	1.230	94.938						
17	0.270	1.172	96.110						
18	0.205	0.890	97.000						
19	0.184	0.799	97.799						
20	0.168	0.731	98.530						
21	0.137	0.596	99.127						
22	0.110	0.478	99.605						
23	0.091	0.395	100.000						

Figure 2.15. Total Variance explained
Authors' own elaboration

	Component						
	1	2	3	4	5	6	7
CGSscore	0.604				-0.465		
CGCommittee	0.556					0.502	
Nationality	0.532						
Ln(Size)	-0.492				-0.422		
EWRating	0.470				-0.440		
Nom%		-0.650					
Rem%	0.433	-0.621					
Ind%		-0.583	0.432				
Audit%	0.419	-0.520					
YBoard		0.490				-0.487	
AVGYQuoted		0.466	0.408				
RemMeet	-0.456		0.614				
Age		0.472	0.590				
RemInd%	0.440		0.590				
AuditInd%			0.583				
NomInd%	0.537		0.581				
AuditMeet	-0.424		0.565				
STDAge			0.434	0.408			
NQuoted				0.750			
STDRole		0.439		-0.559			
NomMeet			0.437		0.521		
BoardMeet	-0.452					0.488	
Edu		0.400					0.483

Figure 2.16. Component Matrix
Authors' own elaboration

	Component						
	1	2	3	4	5	6	7
AuditInd%	0.875						
RemInd%	0.839						
Ind%	0.830						
NomInd%	0.818						
Audit%		0.864					
Rem%		0.802					
Ln(Size)		-0.754					
Nom%		0.673					
NomMeet			0.805				
BoardMeet			0.793				
RemMeet			0.768				
YBoard				0.843			
STDRole				0.826			
Age				0.566			
CGSscore					0.915		
EWRating					0.861		
CGCommittee					0.627	0.617	
Nationality						0.781	
NQuoted						0.623	0.489
AuditMeet			0.435			-0.511	
Edu							0.742
AVGYQuoted							0.610
STDAge							0.598

Figure 2.17. Rotated Component Matrix
Authors' own elaboration

Table 2.4. Communalities

Variable	Initial	Extraction
YBoard	1.000	0.753
NQuoted	1.000	0.785
AVGYQuoted	1.000	0.631
Age	1.000	0.666
Edu	1.000	0.740
Nationality	1.000	0.705
STDRole	1.000	0.775
Ind%	1.000	0.787
Audit%	1.000	0.773
AuditMeet	1.000	0.815
Rem%	1.000	0.731
RemMeet	1.000	0.724
Nom%	1.000	0.643
NomMeet	1.000	0.792
Ln(Size)	1.000	0.619
BoardMeet	1.000	0.730
AuditInd%	1.000	0.778
NomInd%	1.000	0.788
RemInd%	1.000	0.735
CGCommittee	1.000	0.811
CGSscore	1.000	0.896
EWRating	1.000	0.857
STDAge	1.000	0.637

Authors' own elaboration

is labeled as *"Independence factor"*).

- Factor 2: Audit%; Rem%; ln(Size); Nom% (*"Size factor"*).
- Factor 3: NomMeet; BoardMeet; RemMeet; AuditMeet (*"Meeting factor"*).
- Factor 4: YBoard; STDRole; Age (*"Time factor"*).
- Factor 5: CGScore; EWRating; CGCommittee (*"Corporate Governance quality factor"*).
- Factor 6: Nationality; NQuoted (*"Natural Experience factor"*).
- Factor 7: Edu; AVGYQuoted; STDAge (*"Achieved Experience factor"*).

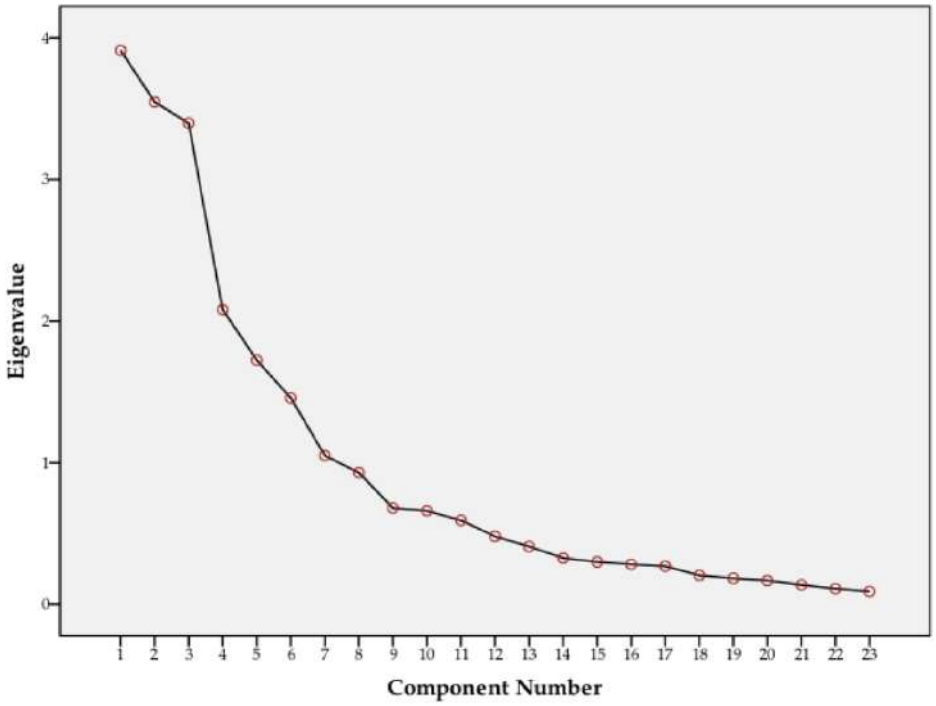

Figure 2.18. Scree Plot
Authors' own elaboration

2. ***Linear regression.*** It is used to model the value of a dependent scale variable based on its linear relationship to one or more predictors. We want to verify the relationship between bank risk and Corporate Governance. To do so, we use three different models to run the linear regression, choosing the *"Enter"* method. We separate the variables in three different blocks: the first containing accounting and market data; the second containing Corporate Governance data, that will be added in the first model; the last containing only Corporate Governance data. In Corporate Governance data we use the seven factors identified in step (1.). Missing values (about 3.5% of the dataset) of each variable are replaced with the average value of the bank for the entire period of observation. Bank risk is measured by the proxy $Z - Score$, following the previous literature (e.g., Laeven and Levine, 2009; Pathan, 2009; Demirgüc-Kunt and Huizinga, 2010; Hadad et al., 2011; Cubillas et al.,

2012; García-Sánchez et al., 2017). $Z - Score$ refers to the degree of solvency (thus, equity is not sufficient to cover losses) of the company. More specifically, it represents the number of standard deviations that Return on Assets (ROA) has to drop before equity is depleted (Laeven and Levine, 2009; García-Sánchez et al., 2017). Considering that ROA is the ratio between Net Income and Total Assets, and naming Capital Ratio (CAR) the ratio between Equity and Total Assets, we can assume that the probability of insolvency can be explained as the probability of $CAR < ROA$ (García-Sánchez et al., 2017). Hence, $Z - Score$ can be computed by the ratio between the sum of ROA and CAR and standard deviation of ROA:

$$Z - Score = \frac{ROA_{it} + CAR_{it}}{SDROA_i} \tag{2.1}$$

where is ROA_{it} of bank i in year t; is CAR_{it} of bank i in year t; and $SDROA_i$ is the standard deviation of ROA for each bank, calculated over the period of observation (from 2006 to 2016). In this way, $Z-Score$ represents the inverse of the probability of insolvency (García-Sánchez et al., 2017). Thus, higher values of $Z - Score$ represent higher level of solvency, and viceversa. To reduce the skewness of this operator, we use its natural logarithm in the analysis. The description of the other variables considered in the analysis, as well as their descriptive statistics, is reported in Table 2.5.

More specifically, we expect the following signs for the relationship between variables:

- **Positive relationship:**
  - Loan Loss Res/NPLs, TCR, CAR, Equity/Liabilities: since a high ratio of these ratios may be good in preventing bank risk;

  - Rating: since a good country rating should be associated with good functioning of banks operating in that country;
  - ExternalC, SuccessionPlan, SayPay, GoldenP: since they are assumed to be best practices in Corporate Governance;

- **Negative relationship:**
  - CostIncome, Ln(NPLs), Ln(Intangibles), Derivatives/TA, NPLs/TA, Subordinated/TA: since they should be associated with a high level of risk in banks financial statements

- **Undetermined relationship:**
  - NIM, Ln(TA), Net Loans/TA, Ownership: since high values of these variables may be associated with high value of risk
  - CGFactor1, CGFactor2, CGFactor3, CGFactor4, CGFactor5, CGFactor6, CGFactor7, Duality, Executives, Re-electionY, Gender, STDQuoted, STDEdu: since, as the review of literature outlined, there is no an univocal consensus about which is the relationship between Corporate Governance characteristics and banks risk taking.

Since they represent structural information, Corporate Governance variables, do not show so much variation over time; moreover, changements in these values usually occur when the Board of Directors is re-appointed. Most of the banks in the sample have a smallest interval of years in which the board members are subject to re-election equal to 3.

Thus, we choose to consider all the Corporate Governance variables (CGFactors as computed with Factorial Analysis included) lagged by 3 years in the regression model. This is also rational if we consider that the effects of Corporate Governance characteristics may not be evaluated in the Annual Report date selected. Finally, this can also be favorable

to avoid endogeneity biases (Cornett et al., 2007).

The three tested models are:

$$Z - Score_i = \beta_0 + \sum_{n=1}^{16} \beta_n X_{ni} + u_i \tag{2.2}$$

$$Z - Score_i = \beta_0 + \sum_{n=1}^{16} \beta_n X_{ni} + \sum_{s=1}^{7} \beta_s CGFactor_{si} + \sum_{n=24}^{33} \beta_n X_{ni} + u_i \tag{2.3}$$

$$Z - Score_i = \beta_0 + \sum_{s=1}^{7} \beta_s CGFactor_{si} + \sum_{n=24}^{33} \beta_n X_{ni} + u_i \tag{2.4}$$

In model 2.2 we look for a relationship between bank risk and both accounting and market data; in model 2.3 we include also Corporate Governance data; in model 2.4 we consider only Coporate Governance data.

2.4 Results

Figure 2.19 and 2.20 show respectively the summary extended exposition of results of the regression models.

The signs of the relations between variables are highly stable over the three model, meaning a good accuracy of the estimation. In particular, as we expected: Loan Loss Res/NPLs; TCR; CAR and Equity/Liabilities are positively correlated with the proxy of *Z-Score*, thus a high ratio of these variables may be good in preventing bank risk. The relationships are

Table 2.5. Descriptive Statistics

Variable	Mean	Std. Dev.	N	Description	Source
Ln(ZSCORE)	0.32	2.03	176	The natural logarithm of Z-Score	
LoanLossRes/NPLs	56.32	13.98	176	The ratio betweem Loan loss Reserves and NPLs	BVD
TCR	14.50	2.36	176	The Total Capital Ratio = (Tier 1 + Tier 2)/Risk Weighted Assets (RWA)	BVD
CAR	6.23	2.34	176	Capital Ratio = Equity/Total Assets	BVD
Equity/ Liabilities	6.78	2.68	176	The ratio between Equity and Liabilities	BVD
NIM	1.67	0.66	176	Net Interest Margin = (Interest Revenues – Interest Expenses)/Total Earning Assets	BVD
CostIncome	64.52	12.44	176	The ratio between operating costs and Net Income	BVD
Net Loans/TA	54.99	16.21	176	The ratio between Net Loans and Total Assets	BVD
Ln(TA)	19.43	1.14	176	The natural logarithm of Total Assets	
Ln(NPLs)	15.79	0.90	176	The natural logarithm of NPLs	
Ln(Intangibles)	14.30	1.57	176	The natural logarithm of Intangibles	
Derivatives/TA	0.07	0.08	176	The ratio between Derivatives Assets and Total Assets	
NPLs/TA	0.04	0.04	176	The ratio between NPLs and Total Assets	
Subordinated/TA	0.02	0.01	176	The ratio between Subordinated and Total Assets	
Rating	11.56	3.37	176	Economist Intelligence Unit (EIU). Overall Country Risk Rating	BVD
Ownership	12.74	6.06	176	BVD Independence indicator - each company's degree of independence to its shareholders	BVD
CGFactor1	-0.01	0.90	176	*"Independence factor"* as computed in the analysis	
CGFactor2	-0.06	0.85	176	*"Size factor"* as computed	
CGFactor3	0.00	0.91	176	*"Meeting factor"* as computed	
CGFactor4	0.01	0.91	176	*"Time factor"* as computed	
CGFactor5	0.00	0.89	176	*"Corporate Governance quality factor"* as computed	
CGFactor6	0.00	0.86	176	*"Natural experience factor"* as computed	
CGFactor7	0.02	0.91	176	*"Achieved experience factor"* as computed	
Duality	0.06	0.24	176	Banks in which the CEO also holds the position of the Chairman of the Board	CG
Executives	15.01	14.25	176	Portion of Executive Directors at the Annual Report Date selected	CG
Re-electionY	3.85	1.17	176	The smallest interval of years in which the board members are subject to re-election	CG
ExternalC	0.62	0.48	176	Does the board or board committees have the authority to hire external advisers or consultants?	CG
SuccessionPlan	0.55	0.49	176	Does the company have a succession plan for Executives in the event of unforeseen circumstances?	CG
SayPay	0.34	0.47	176	Does the company have Say on Pay?	CG
GoldenP	0.26	0.43	176	Does the company have Golden Parachutes?	CG
Gender	84.94	11.66	176	Portion of male Directors at the Annual Report Date selected	Boardex
STDQuoted	2.61	1.50	176	Standard Deviation of Quoted Boards that have been sat on overtime for all the Directors	Boardex
STDEdu	1.10	0.33	176	Standard deviation of the population of the number of Qualifications for all the Directors	Boardex

Authors' own elaboration

also very significant, respectively at 5%; 5% and 1% level of significance (in model 2.2, and always at 10% in model 2.3).

We also find negative and very significant relationship with CostIncome; Ln(NPLs); Ln(Intangibles); Derivatives/TA; NPLs/TA and Subordinated/TA, meaning that these variables should be associated with a high level of risk in banks financial statements. Hence, we can notice that

accounting based data confirm our initial hypotheses (the only exception being rating and ownership variables). Even though, results on Corporate Governance are significant in model 2.3 and 2.4, they seem to be not so very stable in the two models, meaning that CG variables can not be considered as the only explanatory variable of the risk (of performance) of a bank, as we already expected.

Nonetheless, in model 2.3 our results are strongly consistent with agency theory (Jensen and Meckling, 1976; Eisenhardt, 1989; Yermack, 1996; Eisenberg et al., 1998). The agency relationship is the engagement of an agent (manager) to preserve and safeguard principal (shareholder)'s interests on its behalf (Jensen and Meckling, 1976). Conventional wisdom recognises that independence, diversity and expertise enhance corporate governance quality and safeguard shareholders' interests. Fama and Jensen (1983a; 1983b) and Beasley (1996) identify independence as a vital characteristic of directors to mitigate agency conflicts between management and shareholders because their role in the board permit them to perform a better critical monitoring function. Results of the analysis show that there is a positive and highly significant (at 1% level of significance) relationship between independence of directors - *"CGFactor1"* - and the solvency of the bank. This is also consistent with the result obtained on the *"Executives"* variable (negatively related and significant at 5% level of significance). Moreover, consistently with agency theory (Jensen and Meckling, 1976) CEO duality may reduce the ability of the board in preserving shareholders' interests. Indeed, CEO may not separate personal interest from shareholders' interests and the control function of the board may be less effective (Jensen, 1993; Lasfer, 2006). We also find that CEO duality may be related to excessive bank risk, since result show a negative and significant relationship at a 10% level of significance.

ExternalC; SuccessionPlan; SayPay; GoldenP - that are assumed to be best practices in Corporate Governance - as well as Re-electionY; Gender; STDQuoted are not very significant.

That is, Corporate Governance is not important itself, but to the extent in which it prevents excessive bank risk taking and improves performance, dealing with an adequate structure of banks financial statement.

2.4.1 Robustness checks

In Figure 2.19 the Durbin-Watson test confirms that the model can be applied because its value is comprised between 1.5 and 2.5 (1.888). The statistics R^2 and $AdjustedR^2$ show a very good fit of the models 2.2 and 2.3 to the variables (respectively 0.609 and 0.572 for the first model and 0.759 and 0.703 for the second model). Contrariwise, the same statistics are poor for model 2.4, being 0.505 and 0.255. The statistics $FChange$ are highly significant (at a 0.1%, with a value of 0.000) for the three models. The ANOVA table (Figure 2.21) reports significant F statistics for the three models, indicating that using the models is better than guessing the mean of the dependent variable ($Z - Score$). To sum up, we obtain results with a good level of significance, but different biases occur when considering Corporate Governance data in the developing of the analysis, which is commonly known in the Corporate Governance literature. Nevertheless, this is an additional proof that Corporate Governance is not sufficient itself.

Figure 2.23 show the collinearity statistics, computed in order to evaluate potential biases int the model: Tolerance and Variance Inflation Factor (VIF). The first is the portion of the variance in a given predictor that cannot be explained by the other variables. When tolerance values are close to 0, there is high multicollinearity and the standard error of the

	Model 2.2		Model 2.3		Model 2.4	
	Sign	Significance	Sign	Significance	Sign	Significance
(Constant)	---	***	-	***	-	
Loan Loss Res/NPLs	++	**	+	*		
TCR	++	**	+	**		
CAR	+++	***	+	**		
Equity/Liabilities	+++	***	+	**		
NIM	---	***	-	***		
CostIncome	--	**	-			
Net Loans/TA	+++	***	+	***		
Ln(TA)	+++	***	+	***		
Ln(NPLs)	--	**	-	***		
Ln(Intangibles)	---	***	-	***		
Derivatives/TA	--	**	-	***		
NPLs/TA	-	*	-			
Subordinated/TA	---	***	-	**		
Rating	--	**	-	***		
Ownership	---	***	-	***		
CGFactor1			+	***	+	***
CGFactor2			-	**	-	**
CGFactor3			-		+	
CGFactor4			+	*	-	**
CGFactor5			-		+	
CGFactor6			+	***	+	***
CGFactor7			-		-	
Duality			-		-	*
Executives			-	**	-	**
Re-electionY			+		+	
ExternalC			-		-	
SuccessionPlan			-		+	
SayPay			+		+	
GoldenP			+	***	+	
Gender			-		+	
STDQuoted			-		-	
STDEdu			+	***	+	***

Figure 2.19. Results
Authors' own elaboration

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
2.2	0.780	0.609	0.572	1.326	0.609	16.612	15	160	0.000	
2.3	0.871	0.759	0.703	1.105	0.150	4.921	18	142	0.000	1.888
2.4	0.505	0.255	0.168	1.860	0.255	2.941	18	155	0.000	

Figure 2.20. Summary of the models
Authors' own elaboration

Model		Sum of Squares	df	Mean Square	F	Sig.
2.2	Regression	438.291	15	29.219	16.612	0.000
	Residual	281.433	160	1.759		
	Total	719.724	175			
2.3	Regression	546.410	33	16.558	13.566	0.000
	Residual	173.314	142	1.221		
	Total	719.724	175			
2.4	Regression	183.232	18	10.180	2.941	0.000
	Residual	536.492	155	3.461		
	Total	719.724	173			

Figure 2.21. Anova
Authors' own elaboration

regression coefficients may be inflated. As concerns the variance inflation factors, a value greater than 10 is usually considered problematic, since this statistic quantifies the level of multicollinearity and represents the portion of variance of an estimated regression coefficient that is increased because of collinearity. VIF values are well below 10 in Model 2.2 and Model 2.4, but the statics reveal a collinearity bias in model 2.3. Another way of checking whether the regression model has achieved its goal to explain as much variation as possible in the dependent variable while respecting the underlying assumption, is to check the residuals and the unexplained variation. Figure 2.24, 2.25 and 2.26 show respictevely residual statistics and plots that help us to verify that residuals are normally distribuited, as they should be to determine whether the regression model is well structured with a mean of -1.32E-14 and a standard deviation of 0.901.

	Model 2.2					Model 2.3					Model 2.4				
	Beta	Std Error	t	Sig		Beta	Std Error	t	Sig		Beta	Std Error	t	Sig	
(Constant)	-37,500	3,751	-9,997	0,000	***	-32,267	4,902	-6,582	0,000	***	-1,076	1,812	-0,594	0,554	
Loan Loss Res/NPLs	0,021	0,009	2,348	0,020	**	0,017	0,009	1,947	0,053	*					
TCR	0,117	0,054	2,166	0,032	**	0,055	0,054	2,166	0,032	**					
CAR	4,903	1,277	3,839	0,000	***	2,584	1,233	2,096	0,038	**					
Equity/Liabilities	4,491	1,128	3,982	0,000	***	2,368	1,092	2,168	0,032	**					
NIM	-0,765	0,238	-3,216	0,002	***	-0,765	0,284	-2,696	0,008	***					
CostIncome	-0,023	0,011	-2,215	0,028	**	-0,003	0,010	-0,307	0,759						
Net Loans/TA	0,127	0,015	8,590	0,000	***	0,097	0,016	6,203	0,000	***					
Ln(TA)	2,726	0,393	6,942	0,000	***	3,218	0,397	8,101	0,000	***					
Ln(NPLs)	-0,667	0,312	-2,135	0,034	**	-1,348	0,326	-4,130	0,000	***					
Ln(Intangibles)	-0,628	0,155	-4,061	0,000	***	-0,568	0,158	-3,603	0,000	***					
Derivatives/TA	-7,371	2,889	-2,552	0,012	**	-10,613	3,231	-3,285	0,001	***					
NPLs/TA	-11,786	6,379	-1,848	0,066	*	-3,880	7,414	-0,523	0,602						
Subordinated/TA	-57,007	17,592	-3,240	0,001	***	-37,918	17,536	-2,162	0,032	**					
Rating	-0,111	0,055	-2,029	0,044	**	-0,307	0,069	-4,450	0,000	***					
Ownership	-0,163	0,021	-7,743	0,000	***	-0,181	0,025	-7,343	0,000	***					
CGFactor1						0,481	0,150	3,214	0,002	***	0,590	0,176	3,362	0,001	***
CGFactor2						-0,366	0,145	-2,524	0,013	**	-0,504	0,198	-2,548	0,012	**
CGFactor3						-0,018	0,150	-0,119	0,906		0,129	0,191	0,677	0,499	
CGFactor4						0,278	0,147	1,883	0,061	*	-0,370	0,192	-1,924	0,056	**
CGFactor5						-0,001	0,203	-0,005	0,996		0,244	0,236	1,037	0,301	
CGFactor6						0,494	0,204	2,418	0,017	***	0,743	0,281	2,649	0,009	***
CGFactor7						-0,103	0,172	-0,598	0,551		-0,191	0,213	-0,898	0,371	
Duality						-0,468	0,447	-1,048	0,297		-1,274	0,658	-1,936	0,055	*
Executives						-0,016	0,008	-1,982	0,049	**	-0,028	0,012	-2,332	0,021	**
Re-electionY						0,013	0,117	0,110	0,913		0,041	0,146	0,281	0,779	
ExternalC						-0,175	0,266	-0,660	0,510		-0,292	0,385	-0,760	0,448	
SuccessionPlan						-0,309	0,284	-1,087	0,279		0,428	0,405	1,059	0,291	
SayPay						0,125	0,261	0,478	0,633		0,286	0,393	0,728	0,468	
GoldenP						0,886	0,318	2,785	0,006	***	0,283	0,431	0,657	0,512	
Gender						-0,012	0,011	-1,133	0,259		0,000	0,015	0,008	0,994	
STDQuoted						-0,210	0,153	-1,375	0,171		-0,106	0,173	-0,612	0,542	
STDEdu						2,536	0,408	6,210	0,000	***	2,076	0,609	3,411	0,001	***

Figure 2.22. Coefficients
Authors' own elaboration

	Model 2.2		Model 2.3		Model 2.4	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
Loan Loss Res/NPLs	0.663	1.509	0.449	2.225		
TCR	0.612	1.634	0.436	2.292		
CAR	0.112	8.339	0.084	11.108		
Equity/Liabilities	0.110	9.431	0.081	12.375		
NIM	0.406	2.462	0.198	5.045		
CostIncome	0.579	1.729	0.436	2.295		
Net Loans/TA	0.175	5.730	0.109	9.135		
Ln(TA)	0.503	1.881	0.034	2.336		
Ln(NPLs)	0.127	7.864	0.081	12.356		
Ln(Intangibles)	0.171	5.853	0.114	8.772		
Derivatives/TA	0.208	4.814	0.115	8.679		
NPLs/TA	0.160	6.242	0.082	12.154		
Subordinated/TA	0.476	2.099	0.333	3.006		
Rating	0.293	3.416	0.128	7.783		
Ownership	0.619	1.616	0.313	3.190		
CGFactor1			0.385	2.600	0.792	1.263
CGFactor2			0.457	2.186	0.698	1.433
CGFactor3			0.374	2.676	0.657	1.523
CGFactor4			0.386	2.592	0.641	1.559
CGFactor5			0.217	4.614	0.455	2.199
CGFactor6			0.226	4.431	0.339	2.947
CGFactor7			0.284	3.526	0.526	1.902
Duality			0.594	1.683	0.777	1.287
Executives			0.527	1.899	0.674	1.485
Re-electionY			0.373	2.682	0.679	1.474
ExternalC			0.431	2.321	0.582	1.717
SuccessionPlan			0.359	2.786	0.503	1.987
SayPay			0.468	2.138	0.587	1.703
GoldenP			0.364	2.746	0.564	1.773
Gender			0.446	2.240	0.638	1.566
STDQuoted			0.132	7.580	0.293	3.415
STDEdu			0.377	2.656	0.481	2.080

Figure 2.23. Coefficients *(cont.d)*
Authors' own elaboration

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-2.621	5.968	0.315	1.767	176
Residual	-3.893	3.010	-0.000	0.995	176
Std. Predicted Value	-1.662	3.199	0.000	1.000	176
Std. Residual	-3.524	2.725	-0.000	0.901	176

Figure 2.24. Statistics of residuals
Authors' own elaboration

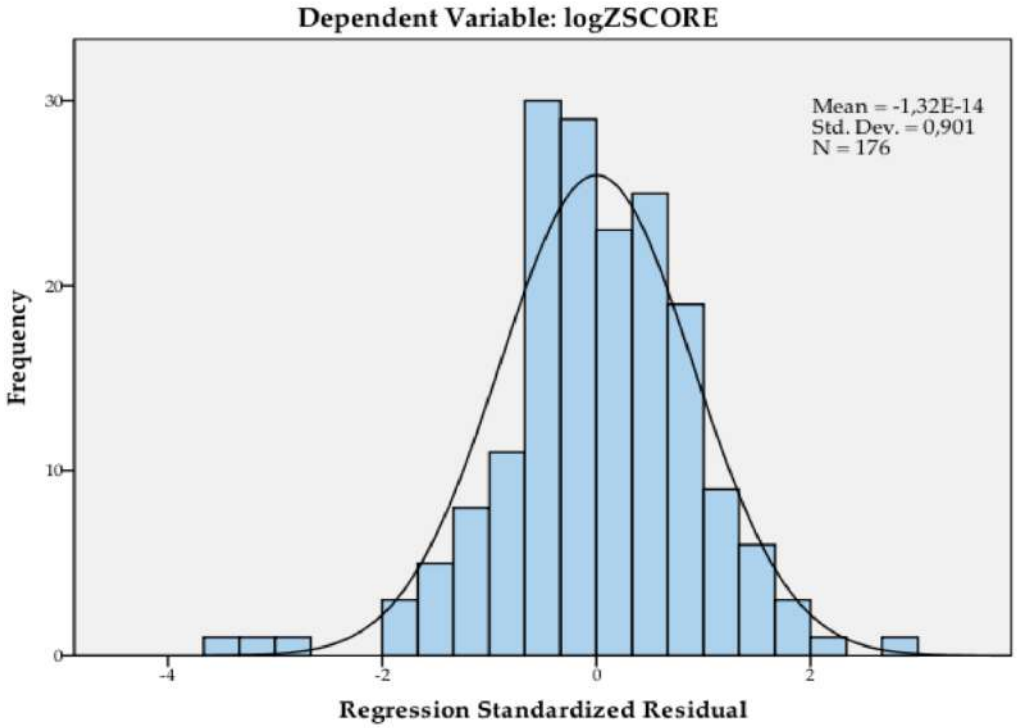

Figure 2.25. Histogram of the residuals
Authors' own elaboration

2.5 Conclusion

Rules come when failures occur.

Banks' safety and soundness are key to financial stability, and the manner in which they conduct their business, therefore, is central to economic health (BCBS, 2015). As a result, soundness of bank Corporate Governance is a crucial element not only for promoting a more resilient financial system (FSB, 2013) but also for sustaining economic growth (OECD, 2004; 2015).

Moreover, shortcomings in the governance of banks can result in the transmission of problems across the banking system and, if widespread, can destabilize the financial system (Levine, 2004; OECD, 2006; BCBS, 2015, EU, 2013). The recent financial crisis that started in 2007 and plagued the economy until the recent years, can be considered as *"a wake-up call"* and highlighted that insufficient attention was paid to bank governance (Ahrens et al., 2011; Adams

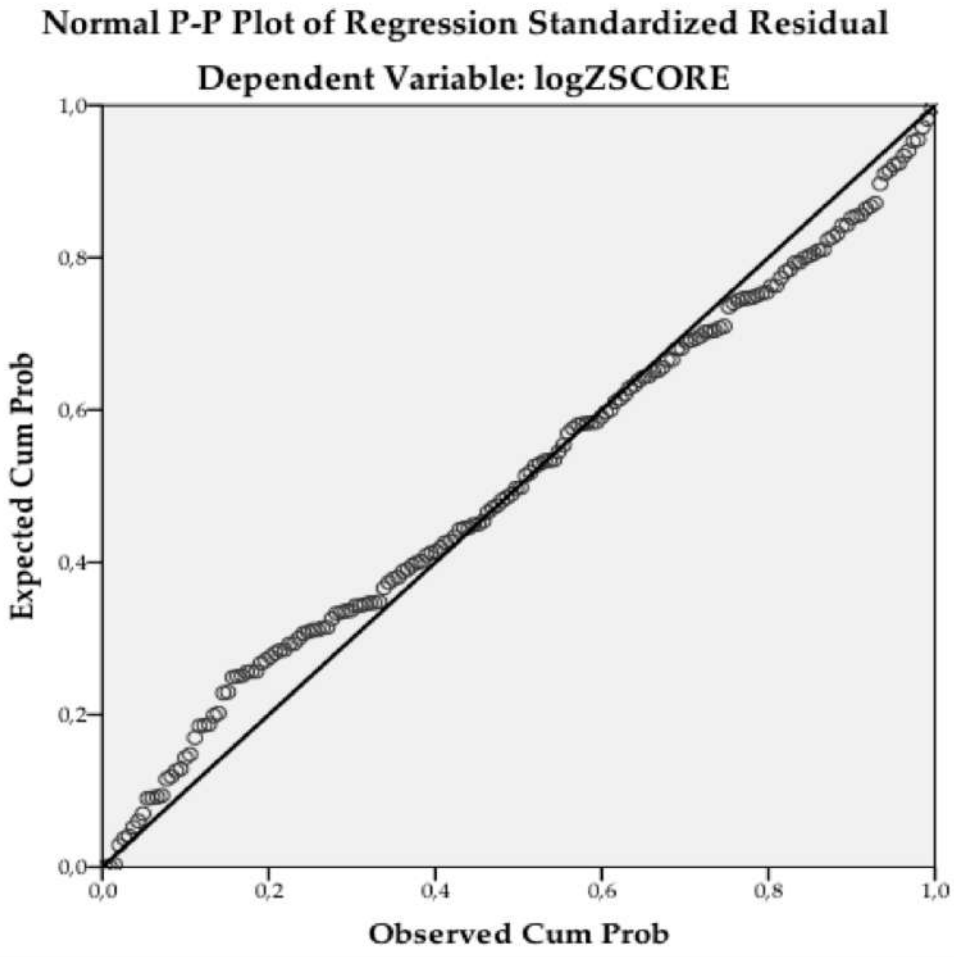

Figure 2.26. Normal P-P Plot of regression standardized residuals
Authors' own elaboration

and Mehran, 2012). Indeed, both academics and practitioners claim that shortcomings in bank governance may have played a central role in the development of the crisis (Kirkpatrick, 2009; Aguilera and Jackson, 2010; Adams, 2012; Aebi et al., 2012; Al-Sa-eed, 2012; Erkens et al., 2012; EC, 2013). The current Regulation calls for Boards of Directors and Committees that prevent the undertaking of excessive risk by financial institutions.

As a matter of fact, Regulation may impact on financial risk taking by financial intermediaries by way of the decision-making process envisaged in the various possible legal structures set forth by the law (Brogi, 2009).

The literature review conducted shows that even though policy makers attribute increasing importance to Corporate Governance, and there is a growing set of rules that are going to be implemented in the next years, there seems to be mixed evidence on the relation between board size and composition and performance in empirical analysis.

We would expect that our results lead us to assess whether or not Corporate Governance needs to be deeply regulated and which are the most relevant Corporate Governance characteristics that may have impact on bank risk. Actually, it seems that Corporate Governance characteristics exert impact on bank risking but governance structures differ systematically across countries. The well-known rule that there is not a *"one size fits all model"*, should teach that banks Corporate Governance regulations must be *taylor-made*, toward creating sound incentives for banks stakeholders. Nonetheless, Corporate Governance is not important itself, but to the extent in which it prevents excessive bank risk taking and improves performance.

Moreover, running after the harmonization of national regulations across economies with very different governance structures may have restrictive effect on the scope of the business judgment rule.

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Chapter 3

Are banks finding their feet?

Cluster analysis of banks' business models

Abstract: Business Model Assessment (BMA) is on the top of the agenda of regulators. The aim of this paper is to examine the relationship between banks' business models and both viability and sustainability, as intended by the European Banking Authority (EBA) in 2014. Business models are identified with a cluster analysis based on assets and funding structure of banks' balance sheet as well as the income diversification. The sample of analysis is composed by the 30 Euro area banks listed on the Eurostoxx banks index. Policy implications are also commented.

JEL classification: G21, G32, L11 *Keywords:* banks, business model, cluster analysis, profitability, risk

3.1 Introduction

"Looking at the priorities for the year ahead of us, I think it is safe to say that the economic environment in which banks operate will remain challenging. In particular, the economic climate in the euro area poses challenges to banks' profitability and many of them will have to review their business models in order to tackle this challenge. Business models in terms of their viability and profit drivers will remain a priority for us in 2016." (Nouy, 2015).

Economic recovery requires a strong and resilient banking system (BIS, 2013). European banking supervisors are addressing this issue by promoting frameworks to review and evaluate European banks, which include the assessment of the viability and sustainability of their business models (EBA, 2014[1]; Nouy, 2015). Indeed, academic research has shown that different banks business models may expose banks to different risks (Cavelaars and Passenier, 2012; Kohler, 2015) and higher profitability may favour a sounder capital structure through retained earnings (Berger, 1995; Thakor, 2014).

Business Model Assessment (BMA) is on the top of the agenda of regulators. In particular, it is one of the four core areas of banking supervision (along with governance and controls, capital, and liquidity) as defined in the Guidelines on common procedures and methodologies for the Supervisory Review and Evaluation Process (SREP) issued by EBA in 2014. The latter Guidelines suggest that competent authorities should conduct regular business model analysis (BMA) to assess business and strategic risks and determine:

- Viability (Ability to generate acceptable returns over the following 12 months) that is in turn related to the analysis of
  - Capital - Comparison of return on equity (ROE) against the cost of equity (COE); additional metrics such as return on assets or risk-adjusted return on capital may be considered;
  - Funding - Appropriateness of funding mix for business model and strategy;
  - Risk appetite - Both for individual and aggregate risks, its consistency with the stated strategy, and its capacity to manage within its risk appetite. Supervisors will take a view on what is an appropriate risk appetite for each bank, as well as for the system as a whole.

[1]EBA (2014), Guidelines on SREP methodologies and processes, 19th December.

- Sustainability (Ability to generate acceptable returns over a forward-looking period of at least three years):
  - Riskiness of the strategy, especially the ambition and complexity of the strategy set against the current business model, and the likelihood of successful delivery of the strategy based on assessment of the board and senior management team's ability to execute it.

This paper focuses inter alia on viability, with the aim of examining the relationship between banks' business model and both profitability and risk.

The assumption of this paper is that bank business models can provide a telling clue to future profitability opportunities and risks.

In assessing bank business models and profitability, two main questions must be answered: (i) what drives profitability (in a low or negative interest rate environment such as the current one)? (ii) are those profits sustainable?

This paper aims to contribute to the recent debate on bank business models by slicing and dicing the profitability drivers of a sample of over 150 European banks, for a ten-year period, starting from the 30 banks which make up the Eurostoxx index. This enables us to use the market valuation of bank performance.

3.2 Institutional background

In its priorities for 2016 the ECB's Supervisory Board announced that it would conduct a Business Model Analysis (BMA): The key risk that stands out relates to banks' business models and profitability. Both are being challenged by the high level of asset impairments and the protracted period of low interest rates. In 2016, building on previous work around banks' business models and on profitability analyses, the SSM is launching a thematic review of banks' profitability drivers at firm level and across business models. The analysis of profitability drivers will facilitate the identification of banks with structurally

low profitability. In this context, an area of supervisory focus will be examining whether profitability is achieved through, among other things, a weakening of credit standards, greater reliance on short-term funding, or an increase in risk exposures not commensurate with the bank's stated risk appetite[2]. The way in which the BMA will be performed has not been disclosed in detail. Each Joint Supervisory Team has provided explanations to supervised banks, but there is no official detailed description of how the BMA will be conducted.

Moreover, the Chair, the Deputy Chair and other members of the ECB's Supervisory Board have commented the bank business models and BMA in their official speeches (Figure 3.1 and 3.2) and based on their statements it seems that the business model classification tool which will be used to conduct the peer group analysis will be based on the more than 80 aspects collected in the SREP assessment and that peer groups will be identified on the basis of business models, size and geography.

3.3 Literature

Academic literature on banks' business model is wide and constantly increasing. Cavelaars and Passenier (2012) surveyed the literature on this topic until 2011. Then, the most relevant paper that examine the relationship between banks' business models and performance or risk are: Ayadi et al. (2011); Beltratti and Stulz (2012); Roengpitya et al. (2014); Kohler (2015); Gabbi and Sironi (2015); Mergaerts and Vennet (2016); Petrella and Resti (2016). There are several definitions of business models reviewed by Cavelaars and Passenier, 2012[3]. We are particularly interested in empirical literature that

[2]ECB Banking Supervision: SSM priorities 2016, 6 January 2016.

[3]Cavelaars and Passenier (2012) report the following definition: *"We define a business model as consisting of two elements: (a) what the business does and (b) how the business makes money doing those things (Weill et al., 2004). A good business model answers Peter Drucker's age-old questions: who is the customer? And what does the customer value? It also answers the fundamental questions every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value*

Source	Quote
Risks and resilience – the European banking sector in 2016. Speech by **Danièle Nouy**, Chair of the ECB's Supervisory Board London, 23 February 2016	*[…] the need to increase profitability and potentially adapt business models is a challenge facing all banks in the euro area.* *The top priority relates to a challenge which all banks in the euro area face and which I already discussed: business models and profitability. (…) More specifically, a thematic review has been started on bank's profitability drivers at firm level and across business models.* *Still, there are more risks out there – although their relevance varies across the euro area. This variance reflects the different structures of the banking sector and different business models of banks.*
Challenges and priorities for the ECB banking supervision. Remarks by **Ignazio Angeloni**, Member of the Supervisory Board of the European Central Bank Dublin, 27 November 2015	*Business models and profitability will be a key priority during 2016. This last year we have developed a business model classification tool to conduct peer group analysis. We have also conducted a survey on banks' profitability forecasts. Building on this work, next year we will conduct in-depth reviews of drivers of banks' profitability at firm level and across business models. One area of interest is the question of how banks are coping with the protracted low interest rate environment and incoming new regulations.*
Qualitative and quantitative banking supervision. Speech by **Sabine Lautenschläger**, Vice-Chair of the Supervisory Board of the Single Supervisory Mechanism Frankfurt, 17 November 2015	*[…] we had four distinct rounds of intensive horizontal analyses throughout the SREP 2015. We sliced and diced the whole SREP assessment and determination process, and compared results for individual banks for more than 80 different aspects among different peer groups, assembled on the basis of business models, sizes and geographies. We scrutinised the assessments for all four SREP elements, all underlying risk types, both for risk level and risk control assessments plus the combination of these two dimensions. We also conducted several thematic reviews.*
European banking supervision after year one: what lies ahead? Speech by **Danièle Nouy**, Chair of the Supervisory Board of the ECB Frankfurt am Main, 10 November 2015	*To make SSM banks stronger and more resilient.* *1) Business models and profitability drivers* *The comprehensive assessment we carried out prior to the start of the SSM has provided us with valuable information on the specific […] supervisory expectations and to challenge the viability of business models and profitability drivers […] we developed a business model classification tool with which we can conduct peer group analyses. We have also conducted a survey on banks' profitability forecasts. […] looking at profitability drivers at the level of individual banks but also across business models. […] having a sound business model that leads to profitability is essential from a prudential perspective too.*
Reintegrating the banking sector into society: earning and re-establishing trust. Speech by **Sabine Lautenschläger**, Vice-Chair of the Supervisory Board of the Single Supervisory Mechanism Milan, 28 September 2015	*Bank's management should develop viable business models with a clear long-term perspective. Many of the recent crises have been the consequence of banks targeting high, but risky, short-term gains rather than pursuing lower, but more stable, long-term returns. Banks should refocus on their core functions:* - *providing valuable investment opportunities to savers, while shielding them from liquidity risk, and providing funds to those who need them, while assessing and monitoring their creditworthiness.* *[…] Financial intermediation is not simply a way to garner revenues; it also supports economic growth and thus, ultimately, provides an important service to society.*

Figure 3.1. Bank business models and BMA in the speeches of the members of the ECB's Supervisory Board and other top ECB officials
Authors' own elaboration

The SSM sails past the starting line: Seeking high-quality supervision and level playing field. Remarks by **Ignazio Angeloni**, Member of the Supervisory Board of the European Central Bank London, 10 November 2014	*Banks covered by the SSM differ widely in business models, asset and funding structures, sector and geographical exposure, client mix, internal organisation and governance, and so on. Countries vary in economic conditions and legal arrangements. How can one take these differences meaningfully into account and yet practice "equal treatment"? What is the meaning of "level playing field", say, between a retailer serving small and medium enterprises and individual depositors, and a large player with global reach and large market exposures? In many cases, banks so diverse will never compete against one other. Whichever the "field" that is supposed to be levelled, banks may never "play" in it at the same time.*
National supervision in a European system: What is the new balance? Speech by **Sabine Lautenschläger**, Member of the Executive Board of the ECB Vienna, 30 September 2014	*In order to be resistant in the long term, a bank needs a sustainable business model; it needs sufficient income in order to bear the risks associated with banking. After all, it shouldn't be forgotten that the balance sheet of a bank – especially a bank with extensive corporate banking – is always a reflection of the economies in which it operates as a financial service provider. […] It is our aim at the ECB to have detailed knowledge of the business model and risk profile of each of the 120 directly supervised institutions. We want to be able to assess, at any time, the risk-bearing capacity, the internal control systems and the governance of banks, and to intervene at an early stage when we see danger. In short, we intend to supervise intensively. I have already spoken in detail about the division of labour with regard to the less significant institutions. In both areas, then, knowledge of national and European markets will be brought together with a single evaluation system, a single supervisory approach and a central, European decision-maker.*

Figure 3.2. Bank business models and BMA in the speeches of the members of the ECB's Supervisory Board and other top ECB officials *(cont.d)*
Authors' own elaboration

proposes a classification of banks based on their business models and links the latter to performance (risk or return). Different banks business models may expose banks to different risks (Cavelaars and Passenier, 2012; Kohler, 2015) and higher profitability may favour a sounder capital structure through retained earnings (Berger, 1995; Thakor, 2014).

There are many ways of identifying business models, all are to some extent arbitrary, one possibility is to break down the sample in universal banks, commercial banks and investment banks based on balance sheet figures as proposed by Ötker-Robe, p.25 et al. (2011) – i.e. or using a mixture of statement of income and balance sheet aggregates as Kohler, 2015. According to the former approach, banks are classified as investment banks if loans are less than 15% of total assets or securities are more than 60% of total assets, and as commercial banks if loans are more than 60% of total assets or securities are less than 15% of total assets and then, after these criteria are applied, all other banks are classified based on judgment, taking into account the scope of derivatives activities, the relative shares of securities and loans, and the share of trading income in total revenue. Kohler's study includes cooperative banks, savings banks, commercial banks, bank holding companies and investment banks, investment corporations and securities houses in 15 EU countries and finds that banks' business models differ in terms of their business objective (based on the share of non-interest income in total operating income and the share of non-deposit funding in total liabilities) and ownership structure.

Furthermore, Roengpitya et al. (2014) identify three business models (retail-funded commercial banks, wholesale-funded commercial banks and capital markets-oriented bank) by applying a clustering algorithm that uses eight selected balance sheet ratios[4]. In particular, they find that the first two models

to customers at an appropriate cost? (Margretta, 2002). The business model is a structural template that describes the organization of a focal firm's transactions with all of its external constituents in factor and product markets (Zott and Amit, 2008)."

[4] *"The asset side ratios relate to: (i) total loans; (ii) securities (measured as the sum of trading assets and liabilities net of derivatives); (iii) the size of the trading book (measured as*

differ mainly in terms of banks' funding structure, while the other stands out primarily because of banks' greater engagement in trading activities. Acharya et al. (2010), Altunbas et al. (2011) and Beltratti and Stulz, (2012) show that a higher leverage ratio and the reliance on short-term capital market funding amplify adverse effects on banks during the subprime crisis. Demirguc-Kunt and Huizinga (2010) similarly report the wholesale funding lowers the rate of return on assets and the enhancing in bank fragility is a particular concern for banks which attract most of their short-term funding in the form of non-deposits. Several authors (Brogi, 2011; Petrella and Resti, 2012; Mergaerts and Vennet, 2015; Calomiris, 2013; Dombret, 2014; Gabbi and Sironi, 2015) express concerns on the impact of the new regulatory framework, and especially on structural regulations, on bank business models. Petrella and Resti (2012) assess that the new liquidity rules set in Basel 3 are expected to prompt a major shift in the business models of banks, tilting their asset mix towards low-risk, low-return assets and possibly constraining their ability to support growth through an adequate credit supply. Gabbi and Sironi (2015) based on an analysis of the different proposals conclude that *"Since the regulatory reaction to the crisis was a reinforcement of the prudential model along with structural solutions, we conclude that such a mixed model could fail the purpose to resolve the trade-off between safety and efficiency"*. More specifically, structural reforms could have the following drawbacks:

- commercial banking is not necessarily safer than investment banking, Dombret (2014) *"the question of stability ultimately depends on the sustainability of the business model. And a commercial bank that is highly*

the sum of trading securities at fair value through income book); and (iv) interbank lending (measured as the sum of loans and advances to banks, reverse repos and cash collateral). The liability side ratios relate to: (i) customer deposits; (ii) wholesale debt (measured as the sum of other deposits, short-term borrowing and long-term funding); (iii) stable funding (measured as the sum of total customer deposits and long-term funding); and (iv) interbank borrowing (measured as deposits from banks plus repos and cash collateral)." Roengpitya, Rungporn, Nikola A. Tarashev, and Kostas Tsatsaronis. "Bank business models." BIS Quarterly Review December (2014).

leveraged and has an unsustainable business model can be as risky as any investment bank. In addition, breaking up the banks would reduce their potential to diversify";

- even though breaking up the banks could reduce the investment bank risk attitude, not only large deposit banks would be protected but also medium-sized institutions could possibly be bailed out by risk-averse regulators (Calomiris, 2013);

- *"though there is a growing consensus on the need and the advantages of separation in theory it is not so clear how to strike the right balance in the separation of commercial banking from other activities in practice. This appears to be the next challenge facing policy-makers, academia and practitioners"* (Brogi, 2011).

Mergaerts and Vennet (2015) investigate a sample of 500 European banks in 1998-2013 and conclude that reforms in banking regulations lead to a further reconsideration of banks' business models, thus the assessment of these initiatives requires a deeper understanding of the performance outcomes associated with different bank business models. The authors identify two different business models: retail and diversification banks using a factor analysis model and studying the impact of business models on bank performance as measured by Return on Equity (ROE), Return on Assets (ROA), Net Interest Margin (NIM) and Z-score. The closest work to this paper is Roengpitya et al. (2014) that propose a cluster analysis and identify three business models: retail-funded commercial banks and wholesale-funded commercial banks – that mainly differ in terms of banks' funding structure – and capital markets-oriented bank – that stands out primarily because of banks' greater engagement in trading activities.

3.4 Methodology

The sample of analysis is composed by the 30 Euro area banks listed on the Eurostoxx banks index. We propose a two-steps methodology. First, a cluster analysis allows a to identify banks business models. The analysis is based on assets and funding structure of banks' balance sheet as well as the income diversification. Then, we *"slice and dice"* banks financial statements data throught descriptive statistics to examine the relationship between different banks' business models and both profitability and risk.

3.5 Data

The sample is composed by 30 Euro Area banks which make up the Eurostoxx index (Table 3.1) all of which are significant entities supervised by the European Central Bank (ECB)[5]. The index is subject to periodic rebalancing and its current structure was introduced on 20 June 2016 with entry of Alpha Bank, the re-entry after a number of years of ABN AMRO, the deletion of Banca Popolare di Sondrio and the substitution of National Bank of Greece with Eurobank Ergasias.

Total assets of banks in the sample is equal to 14,86 trillion euro, representing almost 70% of total assets of banks subject to the SSM which amounted to 22 trillion euro at the end of the comprehensive assessment[6]. Notwithstanding the fact that it is made up of the largest listed euro area banks, the sample is very heterogeneous in terms of size. Average total assets at the end of 2015 amounted to 501 billion euro with a standard deviation exceeding 112%. The top 5 banks have total assets exceeding those of the remaining 25.

[5] As of the list provided on 30th September 2015 which includes 120 credit institutions.

[6] European Central Bank (2014), Aggregate report on the comprehensive assessment, 26th October. *"Note that the following banks did not participate in the comprehensive assessment but will be directly supervised by the ECB as significant institutions: Banco de Credito Social Cooperativo, Banesco Holding Hispania, Banque Degroof S.A., Barclays Bank PLC (Italy), Novo Banco SA, Sberbank Europe AG, Unicredit Banka Slovenija d.d. and VTB Bank AG (Austria)."*

Table 3.1. Components of the Eurostoxx Bank Index

Name	Country	Market Cap 31.12.2015	Total Assets 31.12.2015
BNP Paribas	FR	65,088,295	1,994,193,000
Deutsche Bank	DE	31,157,777	1,629,130,000
Crédit Agricole	FR	28,715,878	1,529,294,000
Banco Santander	ES	65,821,288	1,340,260,000
Société Générale	FR	34,320,317	1,334,391,000
UniCredit	IT	30,671,295	860,433,400
ING	NL	48,178,363	841,769,000
Banco Bilbao Vizcaya Argentaria	ES	42,911,423	750,078,000
Intesa Sanpaolo	IT	49,006,090	676,496,000
Commerzbank	DE	12,022,637	532,641,000
Natixis	FR	16,328,828	500,257,000
ABN AMRO	NL	4,468,854	390,317,000
Caixabank	ES	18,695,008	344,255,500
KBC Groep	BE	24,093,430	252,356,000
Banco de Sabadell	ES	8,920,362	208,627,800
Bankia	ES	12,323,542	206,969,600
Erste Group Bank	AT	12,425,518	199,743,400
Banca Monte dei Paschi di Siena	IT	3,606,458	169,012,000
Banco Popular Espanol	ES	6,581,828	158,649,900
Bank of Ireland	IE	11,003,514	130,960,000
Banco Popolare	IT	4,639,526	120,509,600
Unione di Banche Italiane	IT	5,590,844	117,200,800
Raiffeisen Bank International	AT	3,987,444	114,426,600
Banco Comercial Português	PT	2,951,951	74,884,900
Eurobank Ergasias	GR	2,273,439	73,553,000
Mediobanca	IT	7,631,078	70,710,600
Alpha Bank	GR	3,826,834	69,296,200
Banca Popolare dell'Emilia Romagna	IT	3,388,408	61,261,200
Bankinter	ES	5,878,584	58,659,800
Banca Popolare di Milano	IT	4,040,441	50,203,300
Total		570,549,253	14,860,539,600

Authors' own elaboration on Eurostoxx,
Bloomberg and Bankscope data

Breakdown of sample banks by country (Table 3.2) shows that, in terms of total assets at the end of 2015, French banks make up over a third of the sample, followed by Spanish banks, almost a fifth, and Italian and German banks which represent over 14% of total assets. Average size of banks in the sample varies greatly: French and German banks are much larger than Spanish and Italian banks (average total assets respectively of 1,382 billion euro, 1,090 billion euro, 438 billion euro and 266 billion euro).

Table 3.2. Breakdown by country

Country	N. of banks	Total Assets 2010		Total Assets 2015		Average size 2015	Std. dev. (%) 2015
AUSTRIA	2	337,111,100	2.16%	314,170,000	2.11%	157,085,000	38.40%
BELGIUM	1	320,823,000	2.06%	252,356,000	1.70%	252,356,000	0.00%
FRANCE	4	5,319,085,000	34.14%	5,358,135,000	36.06%	1,339,533,750	46.60%
GERMANY	2	2,659,929,000	17.07%	2,161,771,000	14.55%	1,080,885,500	71.73%
GREECE	2	153,986,300	0.99%	142,849,200	0.96%	71,424,600	4.21%
IRELAND	1	167,473,000	1.08%	130,960,000	0.88%	130,960,000	0.00%
ITALY	8	2,287,290,100	14.68%	2,125,826,900	14.31%	265,728,363	119.11%
NETHERLANDS	2	1,626,604,000	10.44%	1,232,086,000	8.29%	616,043,000	51.82%
PORTUGAL	1	98,546,700	0.63%	74,884,900	0.50%	74,884,900	0.00%
SPAIN	7	2,607,799,700	16.74%	3,067,500,600	20.64%	438,214,371	104.08%
Total	30	15,578,647,900	100.00%	14,860,539,600	100.00%	495,351,320	111.16%

Authors' own elaboration on Eurostoxx, Bloomberg and Bankscope data

Table 3.3. Breakdown by country *(cont.d)*

Country	N. of banks	Market Capitalization 2010		Market Capitalization 2015		CET 1 2010	CET 1 2015
AUSTRIA	2	9,231,384	3.01%	16,412,962	2.88%	8.67%	12.04%
BELGIUM	1	3,483,506	1.14%	24,093,430	4.22%	8.61%	15.76%
FRANCE	4	66,890,812	21.85%	144,453,318	25.32%	11.86%	13.03%
GERMANY	2	33,608,787	10.98%	43,180,414	7.57%	9.99%	15.03%
GREECE	2	2,078,309	0.68%	6,100,272	1.07%	17.18%	29.04%
IRELAND	1	2,470,865	0.81%	11,003,514	1.93%	9.17%	14.92%
ITALY	8	51,009,095	16.66%	108,574,141	19.03%	11.96%	14.51%
NETHERLANDS	2	21,296,062	6.96%	52,647,217	9.23%	11.07%	13.64%
PORTUGAL	1	980,175	0.32%	2,951,951	0.52%	5.51%	16.21%
SPAIN	7	115,145,510	37.61%	161,132,035	28.24%	9.93%	15.02%
Total	30	306,194,506	100.00%	570,549,253	100.00%	10.99%	14.89%

Authors' own elaboration on Eurostoxx, Bloomberg and Bankscope data

Financial data are gathered from Bankscope (Bureau Van Dijk) and include balance sheet, income statement and notes to the financial statements data. While some data are available from 2000 onwards, the period of observation is from 2006-2015 in order to ensure better coverage and consistency of the analysis.

In Table 3.4 we provide a list of selected variables in our data set, with their definition and descriptive statistics. The difference between the average and the median values and the percentage standard deviation show that the sample is heterogeneous in terms of size whilst, as commented in the sections below much more homogeneous in terms of asset mix and profitability drivers. Looking at Table 3.4 we can notice that:

- *Total Assets:* more than half (18) of all the banks in the sample decreased total assets during the period of observation. Almost all of them (except Natixis, that starts from 2006) decreased total assets in the second sub-period (2010-2015). The critical year is 2013, in which almost all the banks decrease total assets (except Alpha bank, BPER, Sabadell, National Bank of Greece) by more than 7.5% on average with a peek of 20.32% of Deutsche Bank. Conversely for Alpha Bank total assets rose by 26.51The trend of almost all the other items in the balance sheet is similar to total assets', with the only exception being the variation of total securities. Indeed, only 13 banks out of 30 in the sample decrease the amount of total securities during the period 2010-2015.

- *Loans:* the trend of loans is consistent to total assets'. 22 banks out of 30 in the sample (most of which being Spanish banks - BBVA, Sabadell, Santander, Bankinter, Caixabank - BNP, Credit Agricole, Deutsche Bank) decrease the amount of loans in the period 2010-2015, after a positive increase for all of the banks during 2005-2010. The two critical years are 2012 and 2013, in which all the banks except Alpha Bank and Sabadell decreased the amount of loans with an average manca qualcosa. Starting

from 2014 all of the banks in the sample increased loans to customers from the previous year. The share of loans on total assets show a positive trend until 2012-2013, in which almost every bank in the sample (the only exceptions being MPS, Credit Agricole, Deutsche Bank, ING, KBC and Raiffeisen) lose on average 5 percentage points. However, there is not a strong evidence of Business Model recomposition (the only exception being Bankia that changes the share of loans on total assets from 68% in 2010 to 47% in 2013 – and 53% in 2015 – and the share of total securities on total assets from 19% in 2010 to 39% in 2013 – and 36% in 2015).

- *Total Securities:* 15 banks decrease the amount of securities in 2011 and all but 7 banks decrease it in 2013. There is a strong difference in 2015 among balance sheet items' variation. Almost all of the banks decrease the amount of securities after an increase in 2014. Contrariwise, the variation of loans and fixed assets is positive for most of the banks.

- *Deposits & Short term funding:* as concerns liabilities, it is quite clear that most of the banks substitute long term funding with short term funding and equity. This is of course no surprise since, following the crisis, regulators all over the world imposed banks higher capital requirements.

- *Total Customer Deposits:* we can further divide Deposits & Short term funding in Total Customer Deposits and Deposits from Banks.

  The first shows a positive trend during all the period of observation except 2011, in which 20 out of 30 banks in the sample decrease the amount of deposits by 10% on average. Moreover, in period 2010-2015 almost all the banks increase the amount of Total Customer Deposits with an average value of 25%.

- *Deposits from Banks:* as concerns Deposits from Banks, we can note a greater increase during 2010-2015 on average of 258%, that is the result

of an increase of the amount of Deposits from banks made up by 17 banks out of 30.

- *Long term funding:* almost all the banks show a huge reduction in long term funding (the only exception being ABN Amro, BNP Paribas and Natixis) during 2010-2015 with an average of 40

  The two most relevant outliers are Natixis and Raiffeisen. The first one decrease its long term funding in 2005-2010 by more than 90% and increase it in the following period by almost 200%. Conversely, Raiffeisen strongly increase the amount of long term funding during 2005-2010 (by more than 10 times) and decrease it in 2010-2015 by 50%. The latter may be related in part to an increase in Raiffeisen's total assets of more than 200% during 2005-2010.

- *Equity:* all the banks in the sample (except Intesa Sanpaolo, KBC and Ubi) increase the amount of equity during 2005-2015. However, if we consider 2014 and 2015, all the 30 banks in the sample increase equity.

  Spanish and Greek banks show a huge decrease in the amount of equity in 2013 with a peek of almost 500% registered by National Bank of Greece. We can also note a strong increase in some of the observation that is due to seasoned equity offerings occurred, with a total capital injection of € 2 billion, overall capital raised by the sample surge to almost +50% the amount in and 2009 and remained strong in subsequent years.

- *Common Equity:* all the banks in the sample (except Intesa Sanpaolo and Ubi) increase the amount of common equity by 150% on average during 2005-2015, 2010 and 2015 being the years of the most relevant increases.

- *Impaired Loans (Memo) and Texas ratio:*

  A significant deterioration in loan portfolio quality also occurred Impaired

Loans - Non Performing Loans (NPLs) of all the banks in the sample registered an approximately tenfold rise in the period. Although there is a quite constant increase during all the period of observation, the critical years are 2008 and 2009, in which every bank in the sample register a deterioration in loan portfolio by more than 100% on average.

This is obviously consistent with the trend of Texas ratio (Impaired loans/Equity), which show a positive variation during 2005-2015 except for Commerzbank and Credit Agricole. Nonetheless if we consider the subperiod 2010-2015 the ratio is negative for the two above-mentioned banks and also for Bank of Ireland, BNP, Deutsche Bank, Natixis and Societe Generale, which are almost all investment banks.

- *Memo: Total Weighted Risks (RWA):* there is a negative variation of Total Weighted Risks (RWA) for half of the banks during the period 2005-2015. However, there is a difference between the first sub-period and the second one. In the first period all the banks except Bank of Ireland increase the amount of Total Weighted Risks (RWA) (the two most relevant increase are those of Greek banks - National Bank of Greece, 117.84%; Alpha bank, 73.52%; and the German Commerzbank -83.12%). Contrariwise, in the second sub-period there is a decrease of the amount of Total Weighted Risks (RWA) for almost all the banks. This consistent with the trend of the share of Total Weighted Risks (RWA) on total assets that decrease in the second sub-period for almost all the banks with an average of about 25%. The highest decreases occur in 2012 and 2013.

- *Total Interest Expense:* the trend in Total Interest Expense is negative for 2005-2015 with 2009-2010 and 2013-2015 being the most critical periods. In particular if we consider 2010-2015 all the banks except the Spanish banks BBVA, Sabadell, Caixabank and Santander show a negative trend

in Total Interest Expense with an average value of about 40%.

- *Total Interest Income on Loans:* this is obviously consistent with the trend of Total Interest Income on Loans.

- *Total Interest Expense on Customer Deposits:* similarly, the trend of Total Interest Expense on Customer Deposits is negative during the period of observation and in particular in 2010-2015 (the only exceptions being MPS, BBCA and Natixis).

- *Net Interest Income:* as a result, the amount of Net Interest Income shows a quite positive variation during 2005-2015 (except for MPS, Banco Commercial Portugues, KBC and Ubi) but there is a widely negative trend during 2010-2015, in particular during 2012 and 2013.

- *Net Fees and Commissions:* the amount of Net Fees and Commissions shows a quite negative trend in 2008-2009 and in 2011-2012 but it results in a positive variation during 2005-2015 for most of the banks in the sample with a peek of 273% by Raiffeisen.

- *Operating Income (Memo):* the variation of Operating Income is positive during 2005-2015 but shows different trend in the two sub-periods with the most critical year being 2011. This may be related to Overheads' trend which is similar with Operating Income.

- *Net Income:* half of the banks considered in the sample show a negative variation on Net Income during 2010-2015 with a peek of more than 650% registered by National Bank of Greece. 2008-2009 and 2011-2012 are the most critical years that show an overall average variation of -273% and 323% respectively.

- *CET1:* the trend of Common Equity Tier 1 is strongly positive over all the period of observation for the entire sample of banks. The average

increase is about 100% and the highest increases are those of Banco Commercial Portugues and Bank of Ireland, equal to 199.58 and 184.67% respectively.

This is obviously consistent with all of the other capital adequacy items (Total capital ratio, Tier 1 ratio)

- *Market To Book, Return on Equity (ROE) and Return On Assets (ROA):* both the market valuation of banks expressed by Market To Book ratio and the banks' profitability, measured by both Return on Assets (ROA) and Return on Equity (ROE), halved during the period. However, the trends of the variables are quite different.

  The decrease of Market To Book ratio over 2006-2015 is the result of (i) a negative variation during the period 2006-2010 for all the banks in the sample (which in turn reflects the average 60% drop of the ratio in 2007); and (ii) a positive variation in 2010-2015 (except for the Spanish banks BBCA, Sabadell and Banco Popular Espanol) that was mostly achieved in 2012 with the ratio starting to decrease again from 2014.

  As concerns ROA and ROE, they show a negative variation during 2006-2015 for almost all the banks in the sample (respectively except Bankinter, Erste and KBC; and KBC) that is the result of a quite constant decrease during each year. For some banks (quali) profitability starts to marginally recover in 2014 while for others in 2015.

3.5.1 Cluster analysis

In order to classify banks by business model, we perform a cluster analysis. This is an explorative methodology which identify homogenous groups (clusters) not previously known by using data as input.

At a first stage, a factor analysis is needed in order to reduce the dimen-

sions of observed data (number of variables) and minimize the multicollinearity effects.

After identifying clusters, we perform a discriminant analysis to check the goodness of fit of the model (if the groups are statistically significant and if the variables significantly discriminate between the groups) since cluster analysis do not provide for robustness test and significance test.

As in Ayadi et al. (2011) and Roengpitya et al. (2014), we implement the cluster analysis by using the Ward's method (1963). The latter is a hierarchical (or agglomerative) method, in which observed variables start in their own separate cluster. The two most similar groups are then combined repeatedly and then the sum of the squared distances within each cluster is calculated. Cluster are finally chosen by identifying the combination that gives the lowest sum of squares.

This first step of the methodology lead us to identify three different homogenous groups (*"clusters"*), named as *"Commercial banks"*, *"Investment banks"* and *"Universal banks"*, which present specific types of bank financial statements composition, as shown in Figure 3.3 and 3.4. Indeed, the latters show respectively that (i) Commercial banks have most of the Assets items composed of Loans, Investment and Universal of Other earning assets; (ii) the ratio between Deposits & Short term funding over Total Liabilities & Equity is quite similar for all the clusters - as well as the ratio between Equity and Total Liabilities & Equity - but there is a notable peek for Commercial banks, which still confirms that this group of banks is more focused on the traditional banking intermediation.

3.5.2 Slicing and dicing the sample

This second step of the methodology involves in turn three steps:

1. investigate profitability and its drivers for banks in the sample;

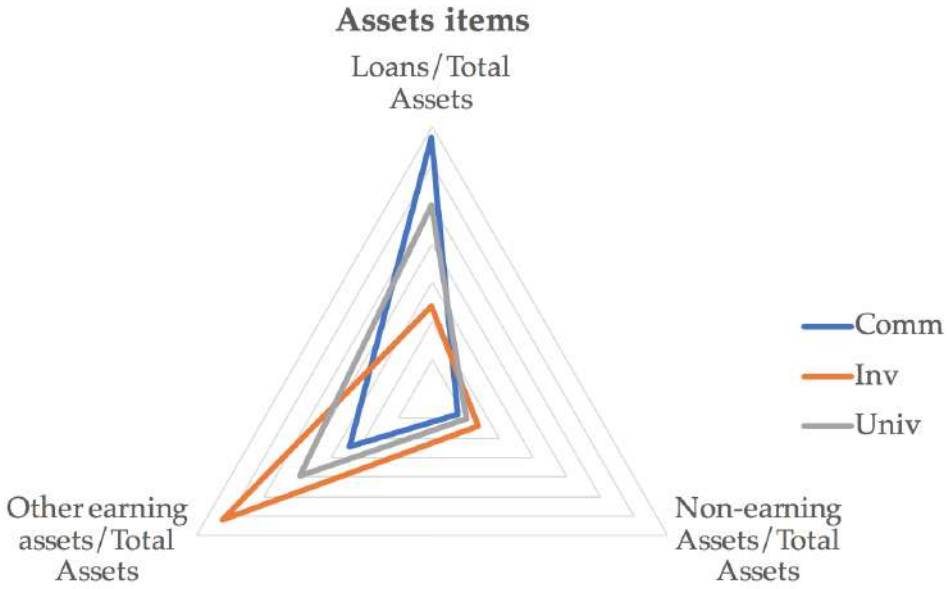

Figure 3.3. 2015 Business Model clusters: Assets items
Authors' own elaboration

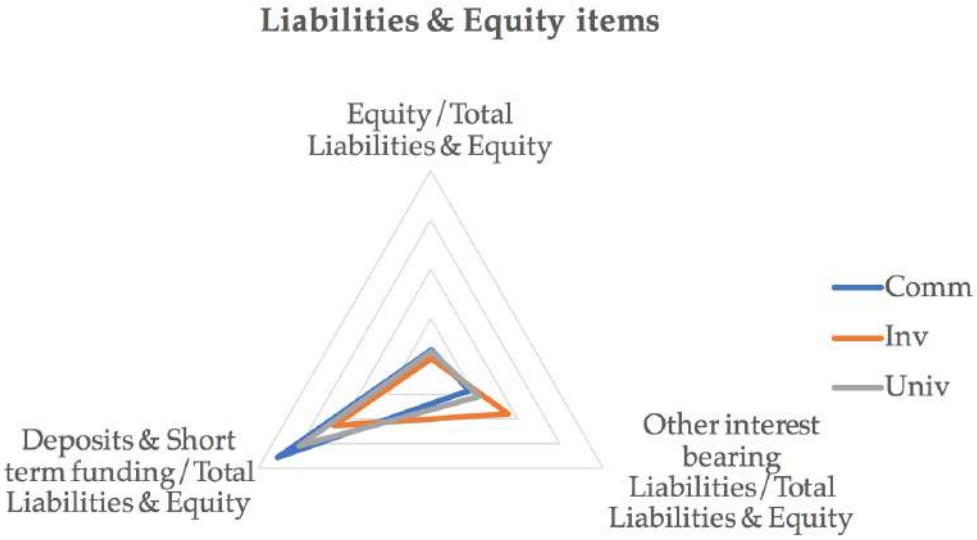

Figure 3.4. 2015 Business Model clusters: Liabilities & Equity items
Authors' own elaboration

2. assess whether past profitability actually explains future profitability and thus whether the emulation of best practices could actually improve bank profitability;
3. examine to what extent all the above issues could be affected by size, business models and country specifics.

There are many ways of identifying business models, all are to some extent arbitrary, one possibility is to break down the sample in universal banks, commercial banks and investment banks based on balance sheet figures. Another option is to create clusters based on relevant similarities (size, profitability, geographical presence). Both approaches are applied in this paper, first we divide the sample based on profitability and then we divide the sample using the breakdown proposed by Ötker-Rob e et al. (2011).

3.6 Results

The list of variables provided in Table 3.4 are used to investigate the sample's balance sheet and statement of income data and key ratios (respectively Figure 3.5, 3.9 and 3.10). Figure 3.6 sets out the evolution over the period of total assets, loans to customers, securities and equity, Figures 3.7 and 3.8 show the recomposition of total assets and total liabilities over the period.

A decline in total assets was registered by more than half of sample banks (18) in the period of observation. Almost all, with the exception of Natixis, decreased total assets in the second sub-period (2010-2015). Natixis starting from 2006. The critical year is 2013, in which almost all the banks reduced total assets (except for Alpha bank, BPER, Sabadell) by more than 7.5% on average with a peak of 20.32% of Deutsche Bank.

Table 3.4. List of variables and descriptive statistics
Authors' own elaboration

Balance sheet					
Variable	Average	Median	Std. Dev. (%)	Min	MAX
Cash and Non-Earning Assets	43.518.038	15.841.000	133,10%	532.300	260.107.000
Loans and Advances to Banks	44.877.700	12.360.000	142,50%	832.700	363.655.000
Derivatives Assets	72.298.163	8.807.000	209,19%	62.800	1.224.493.000
Other Securities	112.793.455	40.443.000	136,81%	2.491.000	972.665.000
Loans	219.596.758	119.439.000	94,31%	22.954.200	758.505.000
Gross Loans	227.860.320	126.184.900	93,50%	23.203.900	785.022.000
Less: Reserves for Impaired Loans/NPLs	8.263.562	5.048.000	107,50%	-	47.955.300
Remaining earning assets	11.864.269	439.900	393,99%	-	331.793.000
Fixed Assets	3.585.891	1.573.200	122,99%	235.000	21.593.000
Total Assets	**508.534.273**	**210.006.300**	**111,54%**	**40.181.100**	**2.202.423.000**
Deposits & Short term funding	264.107.573	141.810.500	101,71%	12.439.700	1.207.062.000
Total Customer Deposits	195.592.060	83.119.000	102,61%	3.966.600	695.116.000
Deposits from Banks	46.516.634	19.109.600	113,44%	-	226.206.000
Other Deposits and Short-term Borrowings	21.998.879	4.518.300	167,43%	-	166.660.000
Other interest bearing liabilities	165.695.588	51.180.800	137,86%	2.045.400	1.477.714.000
Other (Non-Interest bearing) + Loan Loss Reserves + Other Reserves	53.667.336	8.836.300	163,86%	816.200	377.925.000
Equity	25.063.777	12.669.900	100,17%	-6.056.000	100.077.000
Total Liabilities and Equity	**508.534.273**	**210.006.300**	**111,54%**	**40.181.100**	**2.202.423.000**

Income Statement					
Variable	Average	Median	Std. Dev. (%)	min	MAX
Interest Income on Loans	10.299.837	5.035.000	105,44%	-	56.803.000
Other Interest Income	5.572.166	1.736.000	147,71%	-	53.574.000
Dividend Income	206.836	63.000	140,76%	-	1.665.900
Gross Interest and Dividend Income	16.078.839	7.158.500	106,92%	1.217.100	68.604.000
Interest Expense on Customer Deposits	3.269.983	1.212.600	137,34%	-	22.048.000
Other Interest Expense	6.140.260	2.405.800	136,33%	56.500	50.002.000
Total Interest Expense	9.410.243	3.789.600	124,16%	353.700	55.797.000
Net Interest Income	6.668.596	3.264.000	105,37%	473.600	33.267.000
Net Gains (Losses) on Trading and Derivatives	490.493	99.000	552,86%	-33.818.000	10.539.000
Net Gains (Losses) on Other Securities	345.797	88.500	393,90%	-7.978.000	12.718.000
Net Gains (Losses) on Assets at FV through Income Statement	279.294	-	675,34%	-10.831.000	23.477.000
Net Insurance Income	19.957	-	8733,94%	-7.276.000	7.447.000
Net Fees and Commissions	3.080.645	1.556.000	106,39%	192.000	12.765.000
Other Operating Income	228.890	55.200	341,24%	-3.958.000	8.722.000
Total Non-Interest Operating Income	4.445.076	1.819.900	118,78%	-683.000	21.524.000
Equity-accounted Profit/Loss – Operating	97.724	31.500	196,02%	-485.300	915.000
Total Operating Income	11.211.396	5.456.400	103,87%	843.600	45.895.000
Personnel Expenses	3.805.384	2.143.800	105,06%	-	16.061.000
Other Operating Expenses	2.606.125	1.411.700	164,85%	-12.312.000	19.342.000
Total Non-Interest Expenses	6.411.509	3.248.900	110,01%	-	32.635.000
Pre-Impairment Operating Profit	4.799.887	1.704.000	128,33%	-5.754.000	24.188.000
Loan Impairment Charge	2.056.325	1.263.800	126,47%	-34.000	18.523.000
Securities and Other Credit Impairment Charges	269.510	41.400	261,73%	-119.000	6.248.000
Operating Profit	2.474.051	631.000	223,40%	-17.914.800	12.466.000
Equity-accounted Profit/Loss - Non-operating	26.007	-	819,87%	-900.000	2.558.000
Non-recurring Income	211.186	30.700	263,43%	-3.982.000	4.777.900
Non-recurring Expense	426.115	19.600	289,33%	-11.200	10.448.000
Change in Fair Value of Own Debt	-9.671	-	-2134,84%	-1.717.000	1.190.000
Other Non-operating Income and Expenses	-17.684	-	-3016,55%	-3.355.000	2.910.000
Pre-tax Profit	2.257.774	818.000	248,19%	-22.189.200	13.020.000
Tax expense	443.460	214.100	223,91%	-2.996.600	3.856.000
Profit/Loss from Discontinued Operations	33.259	-	1275,37%	-4.320.000	3.987.000
Net Income	**1.847.573**	**681.000**	**270,71%**	**-19.192.600**	**9.636.200**

Authors' own elaboration

Assets	Average % of Total Assets	Median % of Total Assets	Std. Dev. (%)	min % of Total Assets	MAX % of Total Assets	Liabilities and Equity	Average % of Total Assets	Median % of Total Assets	Std. Dev. (%)	min % of Total Assets	MAX % of Total Assets
Cash and Non-Earning Assets	7.92%	7.43%	41.65%	1.15%	19.48%	Deposits & Short-term funding	58.68%	58.93%	21.96%	23.84%	92.49%
Loans and Advances to Banks	5.69%	4.11%	63.70%	0.52%	17.36%	Total Customer Deposits	42.90%	41.34%	31.47%	4.45%	68.70%
Derivatives Assets	7.78%	4.22%	113.74%	0.14%	55.60%	Deposits from Banks	9.21%	8.13%	68.98%	-	43.29%
Other Securities	20.23%	18.55%	42.76%	2.72%	52.01%	Other Deposits and Short-term Borrowings	6.57%	2.09%	161.39%	-	45.41%
Loans	56.37%	59.94%	29.51%	10.33%	83.08%	Other Interest Bearing Liabilities	28.31%	28.32%	41.46%	2.95%	67.09%
Gross Loans	59.05%	63.32%	29.99%	10.42%	89.49%	Other (Non-Interest Bearing) + Loan Loss Reserves + Other Reserves	6.91%	4.19%	83.88%	1.07%	29.54%
Less: Reserves for Impaired Loans/NPLs	2.68%	1.84%	103.50%	-	22.84%	Equity	6.10%	6.18%	37.64%	-2.15%	14.79%
Remaining Earning Assets	1.14%	0.22%	270.64%	-	21.70%	**Total Liabilities and Equity**	100.00%	100.00%	111.54%	100.00%	100.00%
Fixed Assets	0.88%	0.89%	53.01%	0.10%	2.15%						
Total Assets	100.00%	100.00%	111.54%	100.00%	100.00%						

Figure 3.5. Balance sheet aggregates
Authors' own elaboration

Conversely for Alpha Bank total assets rose by 26.51%.

The drop in total assets reflects the contraction in loans shown by 22 banks out of 30 in the sample (especially by Spanish banks - BBVA, Sabadell, Santander, Bankinter, Caixabank - BNP, Crédit Agricole, Deutsche Bank) in the period 2010-2015, after a rise for all of the banks during 2006-2010.

The two critical years are 2012 and 2013, in which all sample banks except Alpha Bank and Sabadell decreased the amount of loans by an average of 4.95%. Nonetheless, starting from 2014 all of the banks in the sample increased loans to customers from the previous year.

Conversely, the majority of sample banks (18) increased total securities (inclusive of derivatives) in the period 2010-2015.

Practically all the banks in the sample (except Intesa Sanpaolo and Ubi) considerably expanded their common equity (with an average rise of 150% over the entire period) with 2010 and 2015 being the years of the most relevant increases

Figure 3.9 sets out main statement of income aggregates in terms of total assets and shows the considerable decline in net income expressed as

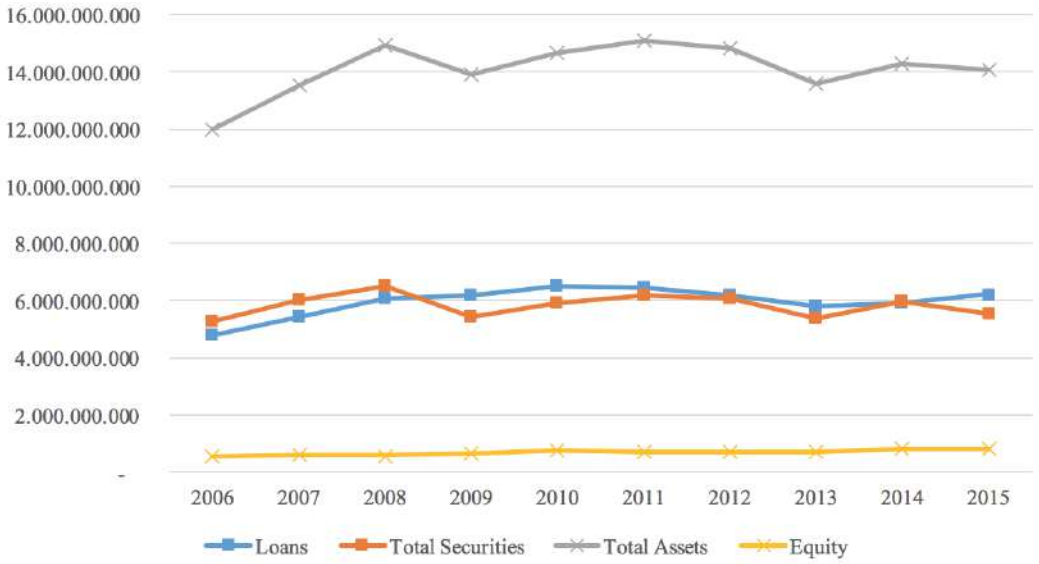

Figure 3.6. Evolution of main balance sheet aggregates
Authors' own elaboration on Bankscope data* (data include only banks with no missing observations for 2006-2015. The figure excludes ABN Amro, Bankia and Caixabank)

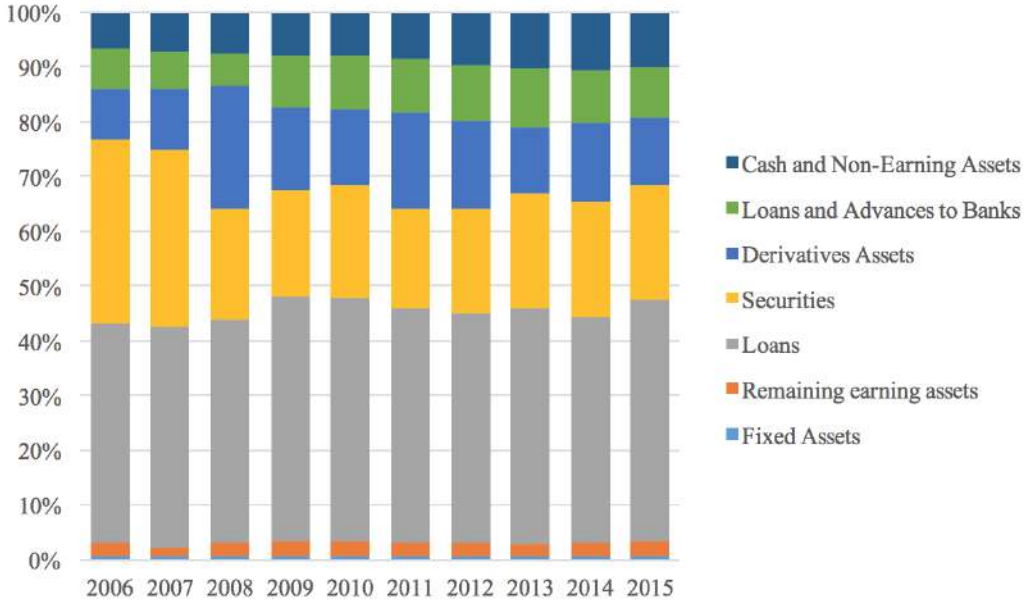

Figure 3.7. Evolution of asset composition of sample banks over the period
Authors' own elaboration

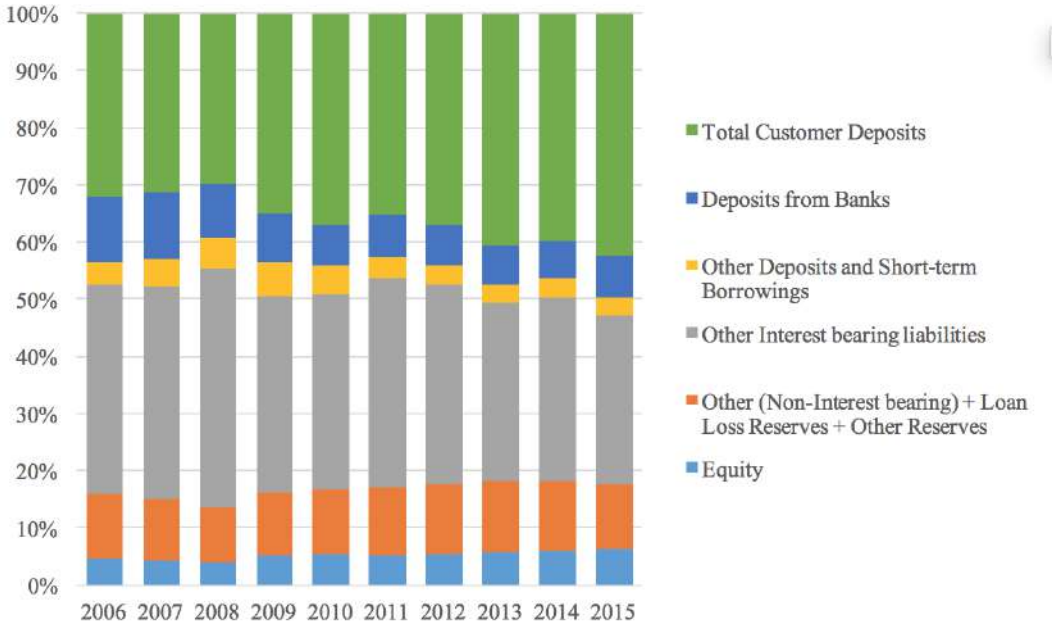

Figure 3.8. Evolution of liability composition of sample banks over the period
Authors' own elaboration

a percentage of total assets which reflected a decrease in non interest income and higher write-downs on loans whilst, despite the increasingly challenging interest rate context, sample banks managed to maintain their net interest margins at levels not far from the beginning of the period.

Sample banks' profitability, measured by both Return on Assets (ROA) and Return on Equity (ROE), halved during the period, with contractions from 2006 to 2015 for almost all the banks in the sample that is the result of a continued downward trend. For some banks profitability starts to marginally recover in 2014 while for others in 2015.

The decrease of Market To Book ratio over 2006-2015 is the result of (i) a negative variation during the period 2006-2010 for all the banks in the sample (which in turn reflects the average 60% drop of the ratio in 2007); and (ii) a positive variation in 2010-2015 (except for the Spanish banks BBCA, Sabadell and Banco Popular Espanol) that was mostly achieved

Average values as % of total assets	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average for the period	Median	Std. Dev. (%)	min	MAX
Gross Interest and Dividend Income	4.07%	4.67%	5.00%	3.77%	3.27%	3.52%	3.42%	3.14%	2.94%	2.78%	3.63%	1.45%	106.92%	0.25%	13.88%
Total Interest Expense	2.41%	3.02%	3.19%	1.97%	1.61%	1.89%	1.89%	1.61%	1.35%	1.13%	1.98%	0.77%	124.16%	0.07%	11.29%
Net Interest Income	1.66%	1.66%	1.82%	1.80%	1.66%	1.63%	1.53%	1.53%	1.59%	1.65%	1.65%	0.66%	105.37%	0.10%	6.73%
Total Non-Interest Operating Income	1.25%	1.12%	0.72%	0.88%	0.86%	0.80%	0.84%	0.94%	0.93%	1.01%	0.93%	0.37%	118.78%	-0.14%	4.35%
Total Operating Income	2.97%	2.83%	2.56%	2.70%	2.56%	2.43%	2.38%	2.48%	2.57%	2.71%	2.61%	0.66%	110.01%	0.00%	6.60%
Total Non-Interest Expenses	1.59%	1.53%	1.54%	1.54%	1.45%	1.53%	1.45%	1.52%	1.50%	1.56%	1.52%	1.10%	103.87%	0.17%	9.29%
Pre-Impairment Operating Profit	1.33%	1.25%	0.98%	1.11%	1.07%	0.86%	0.89%	0.93%	1.03%	1.09%	1.05%	0.34%	128.33%	-1.16%	4.89%
Operating Profit	1.08%	1.00%	0.40%	0.28%	0.41%	-0.46%	-0.38%	-0.03%	0.03%	0.39%	0.25%	0.13%	223.40%	-3.62%	2.52%
Pre-tax Profit	1.20%	1.06%	0.42%	0.27%	0.42%	-0.71%	-0.55%	0.03%	-0.07%	0.30%	0.22%	0.17%	248.19%	-4.49%	2.63%
Net Income	0.90%	0.85%	0.39%	0.20%	0.34%	-0.61%	-0.47%	0.08%	-0.05%	0.26%	0.19%	0.30%	468.00%	-6.80%	3.97%

Figure 3.9. Evolution of statement of income aggregates in percentage of total assets
Authors' own elaboration

	Average	Median	Std. Dev. (%)	min	MAX
Balance sheet ratios					
Loans/Deposits	97.32%	95.95%	30.35%	27.54%	186.48%
NPLs/Loans	8.41%	6.03%	108.63%	0.00%	67.71%
Texas ratio	77.25%	52.59%	220.73%	-1,677.40%	1,608.98%
RWA/Total Assets	47.37%	49.68%	44.31%	0.00%	88.23%
Capital ratios					
CET1	10.93%	11.64%	37.93%	-4.99%	31.87%
Tier 1 Ratio	994.57%	10.52%	33.33%	4.20%	17.00%
Total Capital Ratio	1,246.55%	12.90%	30.31%	7.62%	21.70%
Statement of income ratios					
Return on Equity (ROE)	3.58%	5.66%	739.48%	-193.77%	316.92%
RoRWA (Return on RWA)	0.29%	0.69%	608.38%	-18.40%	5.74%
Return On Assets (ROA)	0.19%	0.30%	468.00%	-6.80%	3.97%
Net Interest Income/Total Operating Income	62.59%	63.84%	22.14%	13.98%	108.81%
Non Interest Income/Total Operating Income	36.18%	34.85%	37.59%	-9.57%	86.02%
Cost To Income Ratio %	62.36%	61.70%	26.39%	24.88%	185.39%
Market ratios					
Pay-out	31.39%	32.84%	260.75%	-474.15%	1,273.62%
Price/earnings	22.86	9.17	6.98%	-53.38	2.656.07
Market To Book	69.83%	62.76%	76.77%	-234.68%	349.13%

Figure 3.10. Key ratios
Authors' own elaboration

in 2012 with the ratio starting to decrease again from 2014.

As expected, the most stable aggregates, measured in terms of percentage standard deviation of observations, both across the sample and also over the period are the various capital ratios that reflect regulatory requirements Total capital ratio (30.31%), Tier 1 Ratio (33.33%), CET1 (37.93%) that for all sample banks increased in the period as a result of higher capital ratios imposed by authorities.

Conversely and somewhat surprisingly, other ratios, more directly connected to business models were actually even more stable across banks and over the entire period: Net Interest Income/Total Operating Income (22.14%) and the cost/income ratio (26.39%) the Loans to deposits (30.35%) and Risk weighted assets to total assets (44.31%).

The most profitable banks (measured both in terms of ROA and ROE) in the ten year period vary considerably over time so slicing the model based on profitability would have led to quite different results based on the starting year and the profitability measure used. Conversely, size and price/book ratios are far more stable.

Comparing profitability with risk shows that larger banks in our sample tend to have higher and less volatile profitability. Low volatility is also an ex post measure of sustainability. Sustainable profitability is important for supervisors since it means that the bank has sufficient income-generating capacity to enable it to maintain an adequate capital base via retained earnings.

Figures 3.11 and 3.12 plot respectively the Average and Standard Deviation of ROA, and the Average and Standard Deviation of ROE on our sample of banks excluding Alpha Bank and Bankia, that are considered outliers. Banks are clustered by size, using the 25th, 50th, 75th and 100th percentiles of Total Assets.

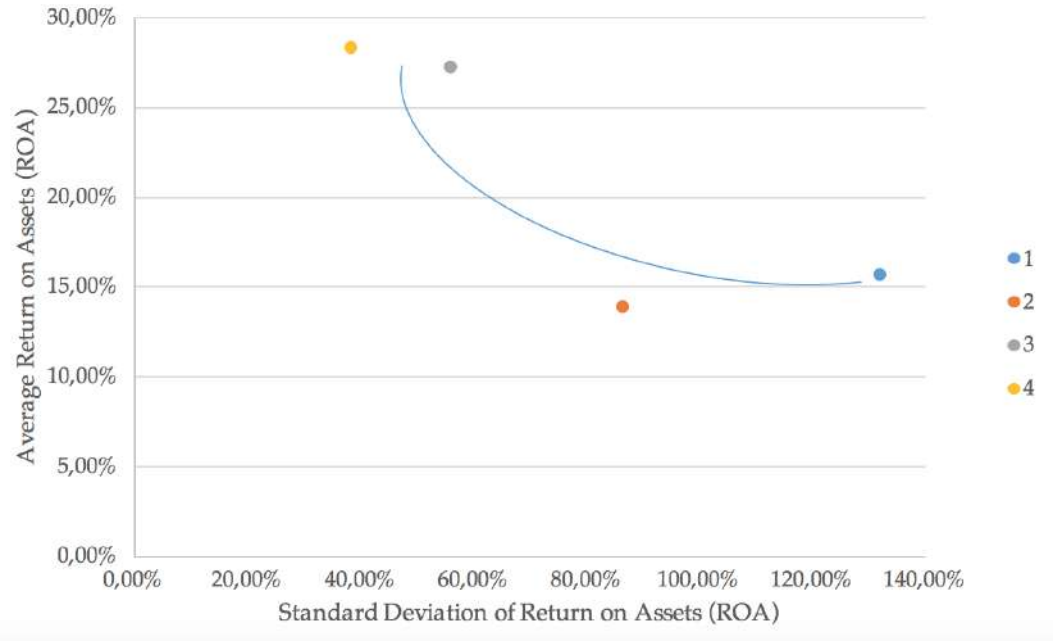

Figure 3.11. ROA and Risk
Authors' own elaboration, data include only banks with no outliers. The figure excludes Alpha Bank and Bankia

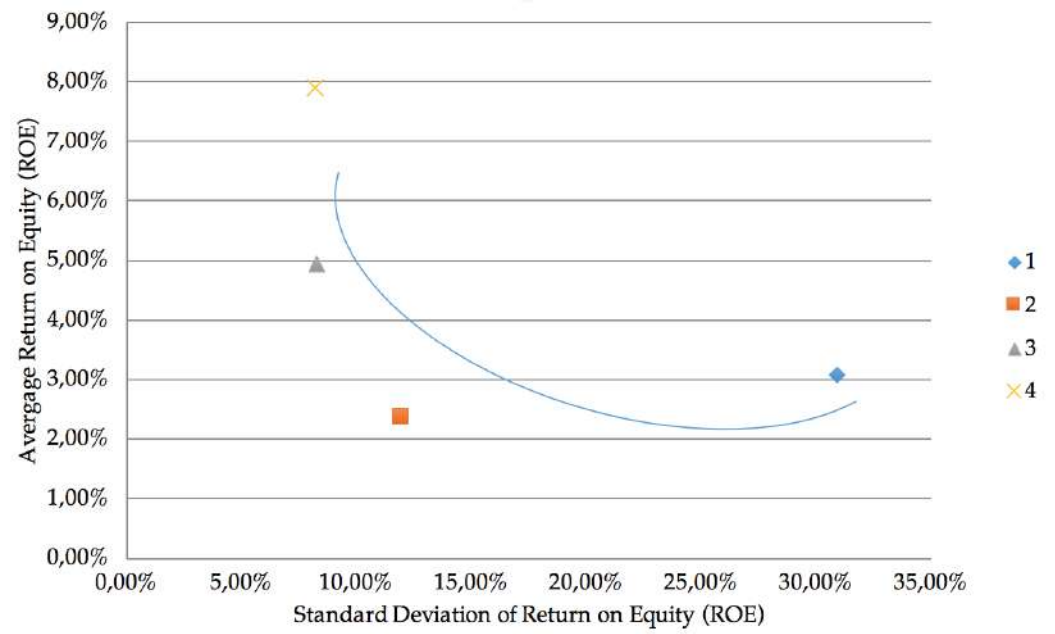

Figure 3.12. ROE and Risk
Authors' own elaboration, data include only banks with no outliers. The figure excludes Alpha Bank and Bankia

Based on this analysis, larger banks seem to be more profitable and at the same time present lower volatility in their results.

We simulate the application of the business models approach proposed by Ötker-Robe et al. (2011) to banks in the sample using 2006 data.

Assets	Average % of Total Assets	Median % of Total Assets	Std. Dev. (%)	min % of Total Assets	MAX % of Total Assets	Liabilities and Equity	Average % of Total Assets	Median % of Total Assets	Std. Dev. (%)	min % of Total Assets	MAX % of Total Assets
Commercial banks											
Cash and Non-Earning Assets	7.17%	7.24%	38.62%	1.38%	14.92%	Deposits & Short-term Funding	63.78%	62.72%	16.48%	44.13%	92.49%
Loans and Advances to Banks	5.56%	3.81%	58.73%	0.93%	16.82%	Total Customer Deposits	50.15%	44.90%	18.51%	27.93%	68.70%
Derivatives Assets	2.73%	1.85%	80.96%	0.14%	10.28%	Deposits from Banks	7.59%	6.74%	78.25%	0.09%	43.29%
Other Securities	14.65%	15.10%	32.78%	2.72%	24.78%	Other Deposits and Short-term Borrowings	6.05%	1.61%	160.33%	-	45.41%
Loans	68.25%	68.23%	10.15%	52.15%	83.08%	Other Interest Bearing Liabilities	25.38%	27.02%	37.84%	2.95%	44.64%
Gross Loans	71.79%	71.74%	9.95%	54.41%	89.49%	Other (Non-Interest Bearing) + Loan Loss Reserves + Other Reserves	4.28%	3.53%	63.26%	1.24%	15.19%
Less: Reserves for Impaired Loans/NPLs	3.55%	2.26%	96.63%	-	22.84%	Equity	6.56%	6.65%	31.93%	-0.97%	13.07%
Remaining Earning Assets	0.61%	0.28%	180.16%	-	9.72%	Total Liabilities and Equity	100.00%	100.00%	130.19%	100.00%	100.00%
Fixed Assets	1.03%	1.00%	44.27%	0.22%	2.15%						
Total Assets	100.00%	100.00%	130.19%	100.00%	100.00%						
Investment banks											
Cash and Non-Earning Assets	9.86%	9.72%	30.93%	5.27%	18.21%	Deposits & Short-term Funding	44.08%	44.96%	17.40%	23.84%	58.66%
Loans and Advances to Banks	6.86%	4.06%	62.91%	0.54%	14.21%	Total Customer Deposits	27.04%	24.76%	43.12%	4.45%	34.86%
Derivatives Assets	25.72%	19.26%	42.87%	11.40%	55.60%	Deposits from Banks	10.69%	7.73%	73.63%	-	21.59%
Other Securities	30.11%	24.78%	33.06%	15.05%	52.01%	Other Deposits and Short-term Borrowings	6.35%	4.17%	72.45%	-	11.07%
Loans	24.20%	25.04%	31.40%	10.33%	35.80%	Other Interest Bearing Liabilities	40.24%	37.98%	23.97%	28.22%	67.09%
Gross Loans	24.95%	25.56%	32.07%	10.42%	37.03%	Other (Non-Interest Bearing) + Loan Loss Reserves + Other Reserves	11.93%	11.54%	18.82%	7.62%	19.09%
Less: Reserves for Impaired Loans/NPLs	0.75%	0.69%	61.63%	0.09%	1.42%	Equity	3.75%	3.94%	23.61%	1.45%	5.02%
Remaining Earning assets	2.62%	0.19%	114.28%	-	1.33%	Total Liabilities and Equity	100.00%	100.00%	43.63%	100.00%	100.00%
Fixed Assets	0.61%	0.51%	76.08%	0.10%	1.33%						
Total Assets	100.00%	100.00%	43.63%	100.00%	100.00%						
Universal banks											
Cash and Non-Earning Assets	6.81%	7.25%	45.33%	1.15%	19.48%	Deposits & Short-term funding	57.07%	57.01%	22.47%	26.97%	84.07%
Loans and Advances to Banks	6.18%	4.80%	63.23%	0.52%	17.36%	Total Customer Deposits	42.79%	40.05%	29.62%	6.96%	63.85%
Derivatives Assets	8.76%	6.49%	65.90%	0.30%	24.09%	Deposits from Banks	11.75%	10.27%	51.87%	1.34%	26.37%
Other Securities	23.38%	22.60%	32.70%	8.67%	38.00%	Other Deposits and Short-term Borrowings	2.53%	1.83%	108.52%	-	9.96%
Loans	51.86%	52.15%	15.29%	37.68%	68.43%	Other Interest Bearing Liabilities	27.94%	24.54%	44.32%	5.98%	59.56%
Gross Loans	54.06%	54.56%	16.04%	38.70%	71.01%	Other (Non-Interest Bearing) + Loan Loss Reserves + Other Reserves	8.64%	4.32%	88.20%	1.07%	29.54%
Less: Reserves for Impaired Loans/NPLs	2.20%	1.88%	65.58%	-	5.67%	Equity	6.36%	6.20%	37.77%	-2.15%	14.79%
Remaining Earning Assets	2.26%	0.19%	213.61%	-	21.70%	Total Liabilities and Equity	100.00%	100.00%	84.06%	100.00%	100.00%
Fixed Assets	0.75%	0.81%	50.93%	0.20%	1.89%						
Total Assets	100.00%	100.00%	84.06%	100.00%	100.00%						

Figure 3.13. Balance sheet aggregates – breakdown by business model
Authors' own elaboration

There are many ways of identifying business models, all are to some extent arbitrary, one possibility is to break down the sample in universal banks, commercial banks and investment banks based on balance sheet figures. Another option is to create clusters based on relevant similarities (size, profitability, geographical presence). Both approaches are applied in this paper, first we divide the sample based on profitability and then we divide the sample using the breakdown proposed by previous literature) and the latter using first a breakdown based on return on equity and

	Average	Median	Std. Dev. (%)	min	MAX
Balance sheet ratios					
Loans/Deposits	109.95%	107.40%	19.44%	65.15%	162.06%
NPLs/Loans	10.53%	6.19%	111.54%	0.29%	67.71%
Texas Ratio	105.87%	64.23%	217.95%	-1677.40%	1608.98%
RWA/Total Assets	58.89%	57.18%	24.10%	27.67%	88.23%
Capital ratios					
CET1	11.52%	11.07%	44.34%	-0.29%	31.87%
Tier 1 Ratio	9.99%	9.80%	26.27%	4.20%	17.00%
Total Capital Ratio	12.61%	12.17%	19.48%	8.73%	21.70%
Statement of income ratios					
Return on Equity (ROE)	0.23%	5.11%	10684.11%	-193.77%	34.92%
RoRWA (Return on RWA)	0.21%	0.55%	773.55%	-8.58%	5.74%
Return On Assets (ROA)	0.15%	0.29%	682.21%	-6.44%	3.97%
Net Interest Income/Total Operating Income	66.01%	66.23%	16.15%	44.98%	94.76%
Non Interest Income/Total Operating Income	33.18%	32.62%	30.26%	5.95%	54.16%
Cost to Income Ratio %	59.40%	56.48%	23.88%	34.22%	162.20%
Market ratios					
Pay-out	31.62%	15.95%	321.15%	-98.16%	1167.65%
Price/Earnings	12.19	9.00	177.45%	-53.37	143.89
Prince to Book	78.75%	64.76%	69.64%	-	314.32%

Figure 3.14. Key ratios – Commercial banks
Authors' own elaboration

another based on capital adequacy.

The division by business models[7] is actually rather constant over time. In our classification we divide sample banks by business models based - investment banks if loans are less than 15% of total assets or securities are

[7]**Commercial banks:** ABN Amro, Alpha Bank, Banca Monte dei Paschi di Siena, Banca Popolare dell'Emilia Romagna, Banca Popolare di Milano, Banco Bilbao Vizcaya Argentaria, Banco Comercial Portugues, Banco de Sabadell, Banco Popolare, Banco Popular Espanol, Banco Santander, Bank of Ireland, Bankinter, Eurobank Ergasias, Unione di Banche Italiane. **Investment banks:** BNP Paribas, Deutsche Bank, Natixis, Sociètè Genèrale. **Universal banks:** Bankia, Caixabank, Commerzbank, Crèdit Agricole, Erste Group, ING Groep, Intesa Sanpaolo, KBC Groep, Mediobanca, Raiffeissen Bank International, Unicredit.

	Average	Median	Std. Dev. (%)	min	MAX
Balance sheet ratios					
Loans/Deposits	54.79%	55.73%	25.04%	27.54%	74.37%
NPLs/Loans	4.74%	5.72%	46.74%	1.33%	7.98%
Texas Ratio	30.38%	30.99%	50.03%	6.51%	54.21%
RWA/Total Assets	26.01%	27.82%	20.93%	13.97%	34.35%
Capital ratios					
CET1	12.56%	12.58%	20.44%	7.23%	19.04%
Tier 1 Ratio	11.08%	11.40%	21.91%	6.62%	16.90%
Total Capital Ratio	13.32%	13.50%	16.49%	8.87%	18.50%
Statement of income ratios					
Return on Equity (ROE)	5.59%	6.40%	129.97%	-16.74%	18.44%
RoRWA (Return on RWA)	0.79%	0.87%	116.09%	-1.70%	2.21%
Return On Assets (ROA)	0.21%	0.24%	113.72%	-0.49%	0.60%
Net Interest Income/Total Operating Income	45.86%	47.22%	40.24%	13.98%	105.39%
Non Interest Income/Total Operating Income	52.07%	51.88%	38.09%	-9.57%	86.02%
Cost to Income Ratio %	76.92%	68.74%	32.23%	57.00%	185.39%
Market ratios					
Pay-out	62.42%	32.61%	135.35%	-7.93%	368.64%
Price/Earnings	15.31	8.71	170.09%	-6.43	12.837
Price to Book	66.65%	63.71%	40.28%	20.62%	136.98%

Figure 3.15. Key ratios – Investment banks
Authors' own elaboration

more than 60% of total assets, and as commercial banks if loans are more than 60% of total assets or securities are less than 15% of total assets and then, after these criteria are applied, all other banks are classified based on judgment, taking into account the scope of derivatives activities, the relative shares of securities and loans, and the share of trading income in total revenue – based on the values of the two ratios at the start of the period (2006). Though some differences in the three groups emerge (Figure 3.13, 3.14, 3.15 and 3.16) and we find evidence that commercial banks are and are likely to remain less profitable for as long as the ECB

	Average	Median	Std. Dev. (%)	min	MAX
Balance sheet ratios					
Loans/Deposits	95.80%	86.52%	29.33%	57.39%	186.48%
NPLs/Loans	6.98%	5.97%	63.51%	0.49%	18.18%
Texas Ratio	55.24%	57.19%	94.09%	-310.49%	167.22%
RWA/Total Assets	48.61%	46.30%	28.67%	26.91%	84.40%
Capital ratios					
CET1	11.52%	12.11%	30.21%	-4.99%	17.16%
Tier 1 Ratio	10.79%	11.08%	22.29%	5.00%	16.80%
Total Capital Ratio	13.78%	13.90%	19.91%	7.62%	19.80%
Statement of income ratios					
Return on Equity (ROE)	7.61%	5.34%	421.23%	-27.07%	316.92%
RoRWA (Return on RWA)	0.23%	0.60%	960.51%	-18.40%	3.02%
Return On Assets (ROA)	0.25%	0.32%	361.25%	-6.80%	2.28%
Net Interest Income/Total Operating Income	64.22%	65.21%	16.86%	33.87%	108.81%
Non Interest Income/Total Operating Income	34.20%	33.49%	30.31%	-8.79%	66.13%
Cost to Income Ratio %	60.92%	61.36%	19.30%	24.88%	116.04%
Market ratios					
Pay-out	60.77%	32.84%	350.09%	-474.15%	1273.62%
Price/Earnings	42.11	9.32	623.49%	-34.78	2.656.07
Price to Book	68.91%	57.67%	81.42%	-234.68%	349.13%

Figure 3.16. Key ratios – Universal banks
Authors' own elaboration

official interest rates will remain very low or negative (Brogi et al., 2015), it is striking that the standard deviation for each of the groups is actually higher than for the entire sample. Moreover, practically same breakdown by business model emerges by applying the ratios to all the years in the period. This provides evidence for the fact that business models tend to be viscous over time. The division by geographical area leads to similar, somewhat discouraging, results.

3.7 Conclusions

In this paper we slice and dice the results achieved by the Euro areas top 30 listed banks in the period from 2006-2015. The most striking similarities in banks in the sample seem to be actually related to their business model, they have similar cost income ratios and are still all considerably dependent on interest income for their profitability. Comparing the 30 banks which make up the Eurostoxx Index, business models have remained very stable in the period (the major exception being Bankia, that changes the share of loans on total assets from 68% in 2010 to 47% in 2013 – and 53% in 2015 – and the share of total securities on total assets from 19% in 2010 to 39% in 2013 – and 36% in 2015). All banks rely quite significantly on Net Interest Income (almost 2/3 of Total Income) and Loans to Customers are quite viscous.

Despite the progressive decrease in interest rates, sample banks managed to maintain their net interest income margin, while total operating income (inclusive of a more fluctuating non-interest income) dropped. However, operating cost containment enabled to maintain stable cost/income ratios. Lower profitability stemmed mainly from write-downs of loans. Size seems to be as significant as business model in explaining performance (measured both in terms of ROA and ROE). Moreover, based on this analysis larger banks seem to be more profitable and at the same time present lower volatility in their results.

The starting point of a business model analysis is the identification of the more profitable players which are then investigated to assess the key drivers for their profitability. However, our analysis does not lead to clearly identify a consistent set of best performers over the period. In other words, a BMA conducted starting on any one given year would have led to chose banks which in subsequent years were no longer the

better performers, thus casting a shadow over the sustainability of their prior superior performance and ultimately on their suitability as reference points for other players.

These findings need to be further investigated but would suggest that structural reforms such as ring-fencing commercial banking activities would not necessarily lead to more stable banks but possibly to banks which could be easier to resolve. Lastly, as concerns more specifically BMA, it could be argued that in the period sample banks endeavoured to pursue more attractive business models even without being nudged by regulators, however it may have proved not to be so easy improve profitability with or without a change in business models irrespective of their potential wish to do so.

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