



This is a self-archived – parallel-published version of an original article. This version may differ from the original in pagination and typographic details. When using please cite the original.

This author accepted manuscript is deposited under a Creative Commons Attribution Non-commercial 4.0 International (CC BY-NC) licence. This means that anyone may distribute, adapt, and build upon the work for non-commercial purposes, subject to full attribution. If you wish to use this manuscript for commercial purposes, [please visit Marketplace](#).

AUTHOR	Muddassar Malik
TITLE	Risk governance and regulatory adjustments in the public commercial banks of OECD
YEAR	2024
DOI	https://doi.org/10.1108/JFRC-06-2023-0090
VERSION	Author's accepted manuscript
CITATION	Malik, M. (2024), "Risk governance and regulatory adjustments in the public commercial banks of OECD", Journal of Financial Regulation and Compliance, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JFRC-06-2023-0090
LICENSE	CC BY-NC

**Risk governance and regulatory adjustments in the public
commercial banks of OECD**

Journal:	<i>Journal of Financial Regulation and Compliance</i>
Manuscript ID	JFRC-06-2023-0090.R2
Manuscript Type:	Original Article
Keywords:	risk governance, regulatory adjustments, banks, regulatory compliance

SCHOLARONE™
Manuscripts

1. Introduction

The primary objective of this study is to investigate the relationship between risk governance characteristics and regulatory adjustments in OECD public commercial banks, focusing on how these elements contribute to banking stability. Specifically, the research will analyze the implications of varying capital requirements as part of the sensitivity analysis, aiming to uncover how risk governance characteristics interact with these regulatory adjustments to affect the overall stability and efficiency of the banking sector.

Risk governance and regulatory adjustments are pivotal in maintaining the banking sector's stability and compliance. This paper primarily examines these aspects from the banks' perspective, focusing on the impact of risk governance on regulatory adjustments. In complex financial markets, banks, often guided by regulators, must establish robust risk governance frameworks to manage risks and maintain stakeholder trust (Andres and Vallelado, 2008; Caprio and Levine, 2002). Regulatory adjustments (BIS-CAP30, 2019), mandated by bodies like BCBS, 36/EU Directive (2013) and Dodd-Frank Act (2010), align banks' financial reporting with regulatory frameworks, ensuring stability (Van Greuning and Bratanovic, 2020). These adjustments, while corrective, can indicate deeper financial management issues, affecting stability and performance (Francis and Osborne, 2012). Understanding the interplay between risk governance and regulatory compliance is crucial for the banking sector's resilience and effectiveness.

This study explores the relationship between risk governance characteristics and regulatory adjustments in OECD public commercial banks. It distinguishes between banks' compliance and specific regulatory mandates, informed by Quintyn and Chenard (2004). Focusing on OECD standards, the research examines how governance impacts financial stability and performance. The findings contribute to understanding the role of regulatory governance in the banking sector, emphasizing its importance in maintaining financial system stability.

The primary objective of this research is to investigate the association between risk governance characteristics and regulatory adjustments in public commercial banks within the OECD. The study specifically evaluates the presence and impact of various risk governance roles, including Risk Committees (RC), Chief Risk Officers (CRO), Chief Financial Officers (CFO), PhD holders (TITLE), senior directors (SENIOR), and independent directors (BI), as outlined in

1
2
3 studies by Minton et al., 2014; Bargeron et al., 2010; Berger et al., 2014; Aebi et al., 2012;
4 Andres and Vallelado, 2008; Caprio and Levine, 2002. Furthermore, the study examines the
5 impact of risk governance on capital requirements, specifically the Tier 1 capital to Risk
6 Weighted assets ratio (TIER1) and total capital to Risk Weighted assets ratio (TCR), exploring
7 their effects on bank stability and performance (Francis and Osborne, 2012). To elucidate the
8 crucial link between risk governance and capital requirements, it is essential to understand
9 how they collectively influence banking stability. Effective risk governance directly impacts
10 the capital requirements of banks, playing a pivotal role in their financial resilience. In
11 particular, this study scrutinizes OECD public commercial banks, where the synergy of risk
12 governance and capital requirements is integral to the health of the banking sector. This
13 research aims to dissect this interplay, providing insights into its significance for banking
14 stability. This exploration is intended to provide insights into how risk governance can support
15 or influence regulatory adjustments within the banking sector.

16
17
18
19
20
21
22
23
24
25
26
27 The choice of OECD countries for this study is intentional. Their varied regulatory
28 frameworks make them an ideal context to explore the relationship between risk governance
29 and regulatory compliance. This approach not only fills a critical gap in existing research but
30 also provides valuable insights into the dynamics of banking regulation across different
31 economic environments, enhancing the study's originality and global relevance. Recognizing
32 the need for a more exhaustive investigation, this research extends its analysis to explore the
33 nuanced effects of risk governance roles, such as CRO and CFO, on regulatory adjustments
34 and bank stability. Employing methodologies like principal component analysis and regression
35 models, the study draws on a theory from corporate governance and financial regulation
36 literature to analyze how specific risk governance characteristics within OECD public
37 commercial banks relate to regulatory adjustments and their overall implications for banking
38 stability and performance.

39
40
41
42
43
44
45
46
47
48
49 This study not only investigates the association between risk governance
50 characteristics and regulatory adjustments in OECD public commercial banks but also delves
51 into how these factors interact with various elements of banks' capital structure, such as
52 TIER1 and TCR. The nuanced findings, especially the differential impacts observed in the
53 sensitivity analysis, underscore a novel contribution to the literature. By exploring these
54 complex relationships, the study offers fresh insights into the dynamics of risk governance
55
56
57
58
59
60

1
2
3 and its implications on financial stability, a topic less explored in existing research within the
4 context of OECD countries.
5

6
7 To achieve the outlined research objectives, a comprehensive research design has
8 been implemented, analyzing data from 14,596 bank-director years spanning 2001 to 2020.
9 This approach allows for a detailed examination of individual director experiences within
10 banks, offering a nuanced understanding of the interplay between risk governance
11 characteristics and regulatory adjustments. It includes information such as the country, bank-
12 specific International Securities Identification Number (ISIN), unique director identifier, risk
13 governance characteristics, regulatory adjustments, and the financial data of the banks. The
14 dataset was derived from merging the BankFocus and BoardEx databases, ensuring a robust
15 and reliable source of information for analysis and findings (Van Greuning and Bratanovic,
16 2020).
17
18
19
20
21
22
23
24

25 The research methodology incorporates a three-pronged statistical approach. Firstly,
26 I analyzed descriptive statistics to provide a comprehensive overview of the dataset,
27 presenting fundamental statistical values for each variable. Secondly, correlation analysis was
28 conducted to explore the associations between risk governance characteristics and regulatory
29 adjustments, providing insights into their relationships. Lastly, Principal Component Analysis
30 (PCA) was employed to identify the underlying structure of risk governance characteristics,
31 reducing data dimensionality and aiding in the identification of critical risk governance factors
32 (Quintyn and Chenard, 2004; Chao and Wu, 2017).
33
34
35
36
37
38
39

40 To directly address the research objectives, regression analysis was performed,
41 incorporating fixed effects and accounting for potential confounding factors by including
42 control variables (Stock and Watson, 2008; Streukens and Leroi-Werelds, 2016). This analysis
43 aimed to test the hypothesis that improved or stronger risk governance characteristics are
44 associated with fewer regulatory adjustments in public commercial banks within the OECD
45 (Andres and Vallelado, 2008). Findings from this research indicate a significant negative
46 relationship between risk governance characteristics and regulatory adjustments in public
47 commercial banks within the OECD. Specifically, the presence of a CRO is significantly
48 associated with regulatory adjustments, as indicated by a correlation coefficient of -0.06 at
49 $p < 0.05$. However, the presence of a CFO and SENIOR does not show a significant correlation
50 with regulatory adjustments, emphasizing the importance of efficient risk governance
51 practices (Srivastav and Hagendorff, 2016).
52
53
54
55
56
57
58
59
60

1
2
3 Regulatory oversight is one of the measures for developing, or improving, coherent
4 risk governance policies (Drake et al., 2006). Theoretical frameworks propose that risk
5 governance has a significant impact on supervising risk and managing risks. (Nguyen and
6 Dang, 2022; Caprio and Levine, 2002). Based on the findings, one perspective to consider is
7 that, instead of focusing exclusively on controlling bank risk, shareholders might benefit from
8 exploring the restructuring of risk governance as a means to enhance the effectiveness of risk
9 management (Nguyen and Dang, 2022; Srivastav and Hagendorff, 2016). Based on the
10 findings, one perspective to consider is that, instead of focusing exclusively on controlling
11 bank risk, shareholders might benefit from exploring the restructuring of risk governance as
12 a means to enhance the effectiveness of risk management (Nguyen and Dang, 2022; Quintyn
13 and Chenard, 2004). Additional research could expand upon this study by exploring a broader
14 range of risk governance characteristics and analyzing their influence on regulatory
15 adaptations within the banking sector (Nguyen and Dang, 2022).

16
17
18 In conclusion, this study reveals a significant relationship between specific risk
19 governance characteristics and the frequency of regulatory adjustments in public commercial
20 banks within the OECD. It highlights the importance of roles such as the CRO and CFO, along
21 with the presence of highly qualified directors, in mitigating risks and enhancing risk
22 management practices (Andres and Vallelado, 2008; Srivastav and Hagendorff, 2016).
23 Policymakers, regulators, and bank management can leverage these findings to refine their
24 risk governance strategies and methodologies. By focusing on structured approaches that
25 encompass guidelines, best practices, and effective oversight mechanisms, they can
26 contribute to a more stable and compliant banking sector. Further analysis and robust testing
27 of the research hypotheses will deepen the understanding of the link between risk
28 governance characteristics, regulatory adjustments, and bank stability (Francis and Osborne,
29 2012). Future research, incorporating additional variables and advanced statistical
30 techniques, has the potential to expand upon the current findings and provide more nuanced
31 insights into the dynamics of risk governance in the banking sector (Quintyn and Chenard,
32 2004; Birindelli and Ferretti, 2008;2013).

2. Theory, Literature Review, and Hypothesis Development

Effective risk governance and regulatory compliance are crucial for the stability and reputation of public commercial banks in the OECD (Quintyn and Chenard, 2004; Srivastav and Hagedorff, 2016). This section provides an overview of the theoretical underpinnings and relevant literature on risk governance, regulatory compliance, and their relationship with regulatory adjustments.

Risk governance involves the identification, communication, application, and supervision of risk within banks (Karyani et al., 2020). This research delves deeply into regulatory compliance theory as a key theoretical underpinning. Regulatory compliance theory, which focuses on the adherence of institutions to laws and regulations, is critical in understanding how banks manage and mitigate risk. This theory sheds light on the mechanisms through which banks align their risk governance strategies with regulatory demands, a process that is vital for maintaining stability and credibility in the banking sector. By exploring how regulatory compliance shapes risk management practices, this study highlights the intricacies of navigating the complex regulatory landscapes that banks operate within. Recent research emphasizes the collective efforts of directors in contributing to risk governance. Directors, regardless of their specific roles, add value to risk management by incorporating their expertise and perspectives (Erin et al., 2018).

Fiene's (2016) "Theory of Regulatory Compliance" examines why banks follow rules, highlighting factors like culture and stakeholder influence. It posits that compliance goes beyond legal requirements, ensuring financial system stability and integrity. This adherence is crucial for protecting banks and their clients (Birindelli and Ferretti, 2008; Francis and Osborne, 2012). Yao et al. (2023) provide a comparative analysis of the American and Chinese banking systems, offering insights into the impact of different regulatory environments on banking stability and compliance. Compliance with regulatory requirements, such as those related to Common Equity Capital, is vital for maintaining financial stability and protecting stakeholders' interests (Rachdi and Bouheni, 2016; Stolz et al., 2003). Furthermore, the interplay between capital requirements and risk governance forms a crucial aspect of banking stability. This research expands the discussion by exploring how capital requirements, as a key element of regulatory frameworks, influence and are influenced by risk governance practices. For instance, higher capital requirements may prompt banks to adopt more

1
2
3 stringent risk governance policies, while effective risk governance can lead to a more efficient
4 capital structure, thus meeting regulatory standards without excessive capital allocation. This
5 bidirectional relationship emphasizes the need for an integrated approach in bank
6 management, where both capital requirements and risk governance are aligned to achieve
7 financial stability. These requirements can be subject to regulatory adjustments, which are
8 changes or modifications made to address evolving financial landscapes or new
9 insights. Penalties imposed by regulators for non-compliance further emphasize the
10 importance of meeting regulatory capital requirements (BCBS; Dodd-Frank Act, 2010; 36/EU
11 Directive, 2013; Ekawati et al., 2021). Recent studies, such as Lubberink and Willett (2023),
12 further illuminate how regulatory capital adjustments impact bank market values, offering a
13 nuanced understanding of the consequences of regulatory non-compliance.
14
15
16
17
18
19
20
21
22

23 The relationship between risk governance characteristics and regulatory adjustments
24 has gained attention in the literature. Strong risk governance practices (Minton et al., 2014;
25 Gontarek and Belghitar, 2018; Lingel and Sheedy, 2012; and Aebi et al., 2012) including the
26 presence of a CRO, CFO, and senior directors are expected to be associated with reduced
27 regulatory adjustments. These characteristics, when effectively implemented, enhance risk
28 management practices and improve regulatory compliance, thereby reducing the likelihood
29 of regulatory adjustments (Srivastav and Hagendorff, 2016). Abou-El-Sood and Shahin (2023)
30 extend this understanding by presenting international evidence on the interplay between
31 bank competition, regulatory capital, and risk-taking. To more explicitly connect the reviewed
32 literature with the hypothesis of this study, it is essential to emphasize how the key studies
33 inform and support the hypothesis development. Drawing on the insights from Fiene (2016),
34 Minton et al. (2014), and others, the hypothesis that 'Risk governance characteristics are
35 negatively associated with regulatory adjustments in public commercial banks within the
36 OECD' is based on the understanding that effective risk governance mechanisms, as
37 evidenced in these studies, lead to improved regulatory compliance and stability. This
38 hypothesis is a direct reflection of the theoretical and empirical insights gained from the
39 literature, highlighting the crucial role of risk governance characteristics in shaping regulatory
40 outcomes in banks.
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55

56 Based on the above discussions, the following research hypothesis is formulated: "Risk
57 governance characteristics are negatively associated with regulatory adjustments in public
58 commercial banks within the OECD." This hypothesis posits that stronger risk governance
59
60

1
2
3 practices within banks lead to lower levels of regulatory adjustments. The research aims to
4 empirically test this hypothesis by examining the relationship between risk governance
5 characteristics and regulatory adjustments in public commercial banks within the OECD.
6
7

8
9 The existing literature offers valuable insights into risk governance, regulatory
10 compliance, and their impact on regulatory adjustments in the banking sector. Studies
11 (Minton et al., 2014; Bageron et al., 2010; Berger et al., 2014; Aebi et al., 2012; Andres and
12 Vallelado, 2008; Caprio and Levine, 2002) highlight the importance of risk governance
13 characteristics, such as the presence of a CRO, CFO, and SENIOR, in reducing regulatory
14 adjustments (Drake et al., 2006; Srivastav and Hagendorff, 2016). These studies emphasize
15 the role of risk governance in enhancing risk management practices and regulatory
16 compliance (Karyani et al., 2020).
17
18
19
20
21
22

23
24 Further research explores the causes of the financial crisis and emphasizes the need
25 for effective risk governance to prevent such crises (Aebi et al., 2012; Francis and Osborne,
26 2012). Studies analyze the relationship between corporate governance and firm performance,
27 highlighting the importance of governance structures in mitigating risks and improving
28 outcomes (Ekawati et al., 2021). Additionally, investigations are conducted to explore the
29 relationship between risk governance and bank stability, providing evidence of the positive
30 impact of strong risk governance practices on bank performance and stability (Erin et al.,
31 2018). In addition, Abdel-Wanis (2021) investigates how regulatory capital and bank
32 characteristics affect risk-taking, offering valuable insights into the regulatory dynamics
33 within the banking sector.
34
35
36
37
38
39
40

41
42 The Basel Committee on Banking Supervision (BCBS) outlines the Basel III framework,
43 which emphasizes the importance of risk governance and regulatory compliance in ensuring
44 the stability of banks and banking systems (Francis and Osborne, 2012). Gropp et al. (2021)
45 further examine the influence of supranational rules, such as Basel III, on national banking
46 systems, highlighting the complexity of implementing international standards. Studies
47 examine the compliance with international accounting standards, emphasizing the role of
48 institutional factors in shaping compliance behavior (Stolz et al., 2003). The regulation of the
49 shadow banking system is investigated, highlighting the importance of effective regulatory
50 frameworks to address systemic risks (Quintyn and Chenard, 2004).
51
52
53
54
55
56
57

58
59 Explorations into the relationship between bank governance, regulation, and risk-
60 taking provide evidence of the impact of governance structures on bank behavior (Srivastav

1
2
3 and Hagendorff, 2016). Studies analyze the relationship between imperfect competition, risk-
4 taking, and regulation in banking, shedding light on the complex interplay between market
5 structure, risk governance, and regulatory oversight (Drake et al., 2006).
6
7

8
9 Additional perspectives include frameworks for managing risks, critically examining
10 regulatory measures and their implications for corporate governance and providing a survey
11 of corporate governance mechanisms and their impact on firm performance (Ekawati et al.,
12 2021). Discussions also cover risk governance, democratic participation, and accountability in
13 the European banking union, exploring the historical perspective of corporate governance
14 and finance in colonial America, and examining the use of market information in prudential
15 bank supervision (Karyani et al., 2020).
16
17

18
19 In summary, the literature highlights the significance of risk governance
20 characteristics, such as the presence of specific roles and advanced degrees, in reducing
21 regulatory adjustments and enhancing risk management practices (Erin et al., 2018). It also
22 acknowledges the importance of regulatory compliance in ensuring financial stability and
23 protecting stakeholders' interests (Francis and Osborne, 2012). Effective risk governance
24 practices play a crucial role in facilitating regulatory compliance and contributing to the
25 overall stability and performance of banks (Quintyn and Chenard, 2004).
26
27

28
29 The next section will discuss the research methodology, including the data collection
30 process, statistical analyses, and regression modeling techniques employed to test the
31 hypothesis and examine the relationship between risk governance characteristics and
32 regulatory adjustments.
33
34

35
36 This section has provided a comprehensive theoretical framework and literature
37 review focusing on risk governance, regulatory compliance, and their relationship with
38 regulatory adjustments in public commercial banks within the OECD. The research hypothesis
39 states that risk governance characteristics are negatively associated with regulatory
40 adjustments, aligning with previous research emphasizing the importance of risk governance
41 in reducing regulatory adjustments (Srivastav and Hagendorff, 2016). The literature review
42 highlights the significance of risk governance and regulatory compliance in maintaining
43 financial stability and minimizing the need for regulatory adjustments (Stolz et al., 2003).
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

3. Research Design

3.1. *Data collection and description*

The dataset for this study provides a comprehensive overview of banks and their directors from 2001 to 2020. It encompasses 14,596 instances, each representing the presence of a specific director in a particular bank for a given year. For instance, if Director A was present in Bank X for three consecutive years, it would be recorded as three separate instances. Over the study period, the dataset captures information from 1,125 unique banks. Additionally, there are 14,404 individual records detailing the presence of directors, reflecting their association with various banks across different years.

It consists of 17 variables related to banks, their directors, and financial information. The dataset includes information on the country, bank-specific ISIN, and a unique identifier for each director. The dependent variable, Regulatory Adjustments (RA), as defined by the Bank for International Settlement (BIS) in CAP30, is essential for transparently representing a bank's financial position, including items like intangible assets and deferred tax assets. RA's role in providing a clearer view of a bank's core capital is underlined by its importance in financial stability assessments, as discussed in the context of the Basel Committee guidelines. The independent variable, RGI (Risk Governance Index), is an aggregated measure derived from a Principal Component Analysis (PCA) of risk governance elements. The presence of a Risk Committee (RC) is included based on the findings of Gontarek and Belghitar (2018) and McNulty et al. (2013), who emphasize its impact on risk-taking and governance effectiveness. The roles of Chief Risk Officers (CRO) and Chief Financial Officers (CFO) are included following the insights from Mongiardino and Plath (2010), and Brancato et al. (2006), who discuss the significance of these positions in enhancing risk governance. The inclusion of PhD holders (TITLE) as a variable is supported by the study of Berger et al. (2014), highlighting their influence on risk management. The factor of senior directors (SENIOR) is incorporated following the findings of Agarwal et al. (2009) and Berger et al. (2014), who note the relationship between director age and risk-taking behaviors. Lastly, the variable of independent directors (BI) is based on the works of Adams and Ferreira (2009), Aebi et al. (2012), and Erkens et al. (2012), which link board independence to improved governance and performance. Control variables like CEO's additional position (CEOAD), the total number of

1
2
3 directors (BS), bank size (SIZE), and its logarithm (LNSIZE) are included due to their recognized
4 impact on corporate governance and risk management, as suggested by Srivastav and
5 Hagedorff (2016). Each variable is meticulously chosen based on its relevance to the study's
6 objectives and its established significance in risk governance and regulatory compliance
7 literature. The financial information was collected from the BankFocus database, while the
8 directors' information was obtained from the BoardEx database.
9

10
11
12
13
14 Frequencies from the dataset reveal that 81 banks have a RC, 15 banks have a CRO,
15 54 banks have a CFO, 91 banks have directors with a TITLE, 117 directors are in the senior age
16 bracket (SENIOR), and 118 banks have Board Independence (BI). These frequencies provide a
17 detailed insight into the distribution and prevalence of risk governance characteristics in the
18 sampled banks.
19

20
21
22
23 The dataset for this study was curated by including banks that are currently
24 operational (active) and publicly traded (listed). The focus was on banks with C1 financial
25 statements, which present a consolidated view of a bank's financial activities by integrating
26 the statements of its controlled subsidiaries or branches. Additionally, C* Additional
27 Consolidated statements, which offer supplementary financial details, were also considered.
28 To compile this dataset, data from the BankFocus database, which provides detailed financial
29 data for banks, was merged with the BoardEx database, which offers insights into board
30 members and senior executives. Only observations that were consistent across both
31 databases were retained to ensure the dataset's accuracy and relevance.
32

33
34
35
36
37
38
39
40 While it's recognized that the dataset, given its extensive coverage, might contain data
41 points that appear as outliers, the decision to retain these outliers is grounded in the
42 research's theoretical framework. The comprehensive nature of this study, aiming to capture
43 the entirety of risk governance practices across diverse banking landscapes, necessitates the
44 inclusion of these data points. While winsorizing is a common technique, its application in this
45 context would not align with the research objectives and could potentially diminish the depth
46 of the analysis.
47

48
49
50
51
52 In the selection of variables for this study, each was chosen based on its relevance to
53 assessing the impact of risk governance on regulatory adjustments. The primary variable, RA
54 , directly reflects the regulatory changes impacting banks, critical for evaluating governance
55 effectiveness. RGI aggregates key governance features, providing a holistic measure of
56 governance structure. Control variables such as CEOAD, BS, SIZE, and LNSIZE were included
57
58
59
60

1
2
3 to account for factors that might influence or confound the relationship between risk
4 governance and regulatory adjustments. For instance, CEOAD offers insights into leadership
5 concentration, which can affect decision-making processes, while SIZE and LNSIZE help
6 account for the scale of the bank's operations, which can influence governance dynamics and
7 regulatory interactions. This careful selection of variables ensures a comprehensive analysis
8 that aligns with the study's objectives and provides a robust examination of the relationship
9 between governance and regulatory compliance.
10
11
12
13
14
15
16
17
18
19

20 3.2. *Research Methodology*

21
22
23 Building on the detailed data description provided earlier, this section delves into the
24 methodological approach adopted for this research. The study leverages a comprehensive
25 dataset to empirically investigate the relationship between risk governance characteristics
26 and regulatory adjustments. Various statistical techniques and models are employed to
27 ensure robustness in the findings and to account for potential confounding factors. The
28 subsequent sections will detail the specific models used, the rationale behind their selection,
29 and the results derived from them.
30
31
32
33
34
35

36 The selection of variables from the database was driven by the need to evaluate risk
37 governance factors. This includes aspects such as the number of board members, their
38 presence on the board, and their professional qualifications, among other relevant factors.
39 Acknowledging the concerns about the relevance of public profiles of board members for risk
40 governance characteristics, it was clarified that the choice of BoardEx was dictated by the
41 availability of this information.
42
43
44
45
46

47 Variables of interest were standardized to reconcile differences in scale and ensure
48 comparability. A PCA was then conducted on these standardized variables with an aim to
49 identify the principal components that would explain the greatest variance in the data.
50
51
52

53 Subsequently, the data was transitioned into a panel setup, arranged based on unique
54 combinations of bank and director identifiers and the corresponding year. The research
55 employed a fixed-effects modeling approach, aligning closely with the theoretical
56 underpinnings of the study, especially given the span across OECD countries and over a 20-
57 year period. Additionally, the fixed-effects model is particularly advantageous in mitigating
58
59
60

potential endogeneity issues arising from unobserved heterogeneity. By controlling for both bank-specific and time-specific effects, the model accounts for the possibility that unobserved factors, which could be correlated with both the independent and dependent variables, might bias the results. This approach effectively isolates the impact of risk governance characteristics on regulatory adjustments, providing more reliable and accurate estimates of their relationships. The model was estimated using the "xtreg" command in Stata, which is specifically designed for panel data regressions, allowing for the estimation of both fixed-effects and random-effects models.

An econometric model was designed to encapsulate the regulatory adjustments occurring in different countries.

$$\text{Model 1: } RA_{bt} = \theta_0 + \theta_1 * RGI_{bt} + \theta_2 * CEOAD_{bt} + \theta_3 * BS_{bt} + \theta_4 * SIZE_{bt} + \alpha_b + \delta_t + \varepsilon_{bt}$$

In this research, a primary focus is placed on the dependent variable, RA (Regulatory Adjustments). Regulatory adjustments, as defined by the Bank for International Settlement (BIS) in CAP30, are crucial for banks. They encompass various elements such as intangible assets, deferred tax assets, cash flow hedge reserve, and cumulative gains and losses due to changes in own credit risk on fair valued liabilities. Primarily applied to Common Equity Tier 1, these adjustments aim to provide a transparent view of the Common Equity Tier 1 to all stakeholders. Institutions are mandated to apply these requirements to all their assets measured at fair value when calculating their own funds. Furthermore, any additional value adjustments deemed necessary are deducted from the Common Equity Tier 1 capital. The model, therefore, examines the relationship between RA and the independent variables, including the Risk Governance Index (RGI), which has been renamed from Comp1 following a PCA, CEOAD, BS, and SIZE. In the model, RA_{bt} represents the Regulatory Adjustment for bank b in year t . Here, b denotes the bank and t represents time in years. The model controls for bank and time fixed effects denoted by α_b and δ_t , respectively for unobserved heterogeneity across banks and time. The error term, ε_{bt} , represents the unobserved factors influencing the dependent variable. Clustered standard errors at the bank level are employed to account for potential correlation within banks. These adjustments mirror the diverse national regulatory environments, economic conditions, and governance structures. Distinctions were made between regulatory adjustments as changes mandated by regulators,

and governance and controls as the bank's internal mechanisms. The 'beta', or the slope intercept, is the baseline level of Regulatory Adjustment in the absence of other control variables.

The main regression analysis utilized the `reghdfe` command. This command is an extension of Stata's standard regression command, specifically tailored for high-dimensional fixed effects models. It efficiently estimates linear regressions with multiple levels of fixed effects by absorbing these effects. In this research, the `reghdfe` command was employed to estimate the fixed effects model, absorbing both year and bank fixed effects. Additionally, standard errors were clustered at the bank level to account for potential correlations within banks and to provide robust standard errors. To assess the robustness of the main regression analysis, a bootstrap procedure with 100 repetitions was conducted (Karyani et al., 2020). To assess the robustness of Model 1, a bootstrap technique is employed with 100 replications to assess the robustness of the results from Model 1 in Model 1a. The bootstrap resampling method generates multiple replicated datasets by sampling with replacement from the original dataset. This approach allows for the estimation of coefficients' stability and provides robust standard errors. The estimated coefficients and their significance levels are evaluated using the bootstrap results.

A sensitivity analysis was conducted using alternative dependent variables, "TIER1" (Tier 1 capital / Risk Weighted assets) and "TCR" (Total capital / Risk Weighted assets), to test the robustness of the results obtained with the primary dependent variable, RA (Regulatory Adjustments). Both TIER1 and TCR are critical indicators of a bank's financial health and stability. Given that regulatory adjustments primarily influence Common Equity Tier 1, which is a component of TIER1, there's an inherent relationship between these variables. By examining the results across RA, TIER1, and TCR, the analysis aims to ascertain the consistency and robustness of the findings. The models were estimated with fixed effects, clustering the standard errors at the bank level, and employing a bootstrap with 100 repetitions to further assess robustness.

Sensitivity models:

$$\text{Model 2: } TIER1_{bt} = \gamma_0 + \gamma_1 * RGI_{bt} + \gamma_2 * CEOAD_{bt} + \gamma_3 * BS_{bt} + \gamma_4 * SIZE_{bt} + \alpha_b + \gamma_t + \varepsilon_{bt}$$

$$\text{Model 3: } TCR_{bt} = \delta_0 + \delta_1 * RGI_{bt} + \delta_2 * CEOAD_{bt} + \delta_3 * BS_{bt} + \delta_4 * SIZE_{bt} + \alpha_b + \gamma_t + \varepsilon_{bt}$$

1
2
3
4
5 In Model 2, $TIER1_{bt}$ represents the dependent variable, for bank b in time period t . The
6 independent variables are RGI, CEOAD, BS, and SIZE for the corresponding bank and time
7 period. The fixed effects, α_b and γ_t capture bank and time heterogeneity, respectively, while
8 the error term, ε_{bt} , accounts for unobserved factors influencing the TIER1.
9
10

11
12 To assess the robustness of Model 2, a bootstrap technique is employed in Model 2a
13 same as in Model 1. Similarly, in Model 3, TCR_{bt} represents the dependent variable, TCR for
14 bank b in time period t . The independent variables and other definitions of fixed effects and
15 error term are same as in Model 1 and 2 along with the application of bootstrap technique
16 for robustness of Model 3 in Model 3a.
17
18
19
20

21 In conclusion, the methodology, underpinned by data on OECD banks spanning 20
22 years, seeks to elucidate the relationship between regulatory adjustments and risk
23 governance. While the paper does not directly study variations across national contexts or
24 provide a baseline understanding in the absence of governance and control variables, the
25 comprehensive dataset inherently captures the nuances and variations over time and across
26 different banking environments. This approach offers valuable insights into the dynamics of
27 regulatory adjustments in relation to risk governance.
28
29
30
31
32
33
34
35

36 [Insert Table I here]
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

4. Results

4.1. Descriptive Statistics

This section presents a detailed overview of the descriptive statistics for key variables in the dataset. The dataset encompasses 14,596 bank-director years from 2001 to 2020, providing a comprehensive view of the banking landscape within this period.

Each variable is selected for its relevance to the study's focus on regulatory compliance and risk governance. The RA variable, with a mean value of 548,608 € and a standard deviation of 4,100,070 €, is central to understanding the scope and frequency of adjustments made by banks in response to regulatory changes. TIER1 and TCR offer insights into banks' capital adequacy, while variables like RC, CRO, CFO, TITLE, SENIOR, and BI provide a nuanced view of the composition and characteristics of bank boards. This section not only presents these statistics but also contextualizes them within the broader framework of regulatory compliance and risk governance, crucial for accurately interpreting the data and understanding its larger research implications.

Table 2 presents the descriptive statistics for the variables in the dataset. The variable RA, with a mean value of 548,607.9 and a standard deviation of 4,100,070. The variable TIER1, with a mean value of 13.24027 and a standard deviation of 3.202067. The variable TCR, with a mean value of 15.23164 and a standard deviation of 3.44537. Other variables such as RC, CRO, CFO, SENIOR, and BI are also included in the table. These descriptive statistics provide an overview of the distribution and variation of the variables in the dataset. The descriptive statistics in this study, particularly in relation to RA, TIER1, and TCR, resonate with trends observed in the seminal work of Francis and Osborne (2012). Their investigation into the impact of capital requirements on bank behavior provides essential context for understanding how regulatory frameworks influence banking operations. The variable RA, characterized by a significant mean and standard deviation, indicates substantial variability in banks' responses to regulatory changes. This aspect of the findings can be contrasted with the research by Francis and Osborne (2012), who explored the impact of capital requirements on bank behavior. While their study provides a broad overview of the regulatory impacts, the current analysis extends these insights by highlighting specific variances in key variables, thereby

1
2
3 contributing to a more nuanced understanding of banks' behaviors under different regulatory
4 environments. This study extends these insights by showcasing the specific variances in key
5 variables within the dataset, thereby contributing to a more nuanced understanding of bank
6 behaviors under different regulatory environments.
7
8
9

10
11
12 [insert table II here]
13
14
15

16 4.2. Correlation 17 18 19

20 In this section, the correlation matrix is used to explore the relationships between different
21 variables, particularly focusing on risk governance characteristics and their influence on
22 regulatory adjustments. This matrix is a crucial statistical tool that helps in understanding how
23 variables are interrelated within the dataset. The correlations provide insights into potential
24 associations but do not imply causation. For instance, a negative correlation between RA and
25 TIER1 suggests an inverse relationship, but it's important to consider other factors that might
26 be influencing these variables.
27
28
29
30
31

32 To address concerns about multicollinearity, which arises when independent variables
33 in a regression model are highly correlated, this study has conducted careful variable selection
34 and analysis. While some degree of correlation is expected due to the nature of the variables
35 studied, the impact on the regression models is mitigated through the use of advanced
36 statistical techniques and the interpretation of results in the context of existing literature.
37
38
39
40
41
42 This approach helps ensure that the findings are robust and reliable.
43

44 The correlation matrix presents the relationships among the variables in the study,
45 focusing on risk governance characteristics and their association with regulatory adjustments.
46 Among these characteristics, only the CRO shows a small negative correlation with regulatory
47 adjustments, while the CFO and TITLE do not exhibit significant negative correlations with
48 regulatory adjustments. Conversely, the presence of a RC shows a positive correlation, and BI
49 exhibits a significant positive correlation with RA. These findings suggest that while certain
50 risk governance characteristics may influence regulatory adjustments, their impact varies. The
51 observed correlations in this study, particularly those related to risk governance
52 characteristics such as the presence of a CRO and their impact on regulatory adjustments,
53 offer noteworthy insights. These findings are in line with the research conducted by Erin et al.
54
55
56
57
58
59
60

(2018) on the Nigerian banking sector, which also underscored the influence of risk governance on bank performance. Furthermore, the relationship between risk governance characteristics and regulatory adjustments resonates with the findings of Srivastav and Hagendorff (2016), who emphasized the significance of these factors in the banking sector. The current analysis enriches this discourse by providing empirical evidence from the OECD public commercial banks, thereby contributing to a more comprehensive understanding of risk governance within diverse regulatory contexts. This study's findings, particularly the correlation between risk governance characteristics and regulatory adjustments, align with Erin et al. (2018). Their research on the Nigerian banking sector similarly highlighted the influence of risk governance on bank performance, underscoring the relevance of these correlations in understanding bank behavior within regulatory frameworks. The correlation matrix provides clear evidence of specific relationships between risk governance characteristics and regulatory adjustments, underscoring the need for careful interpretation and consideration of broader research implications, as discussed in Srivastav and Hagendorff (2016). Further analysis is needed to assess the statistical significance and strength of these associations.

[insert table III here]

4.3. *Principal Component Analysis*

Building on the foundational understanding of risk governance practices highlighted in the previous work such as Karyani et al. (2020), this study conducts a PCA to explore the underlying structure and dimensionality of specific risk governance characteristics. The variables of interest, namely RC, CRO, CFO, TITLE, SENIOR, and BI, were included in the analysis to further investigate their interrelationships and potential impact on regulatory adjustments. The PCA analysis identified six principal components based on the variance in the dataset. The first component, labeled as Comp1, captured the most variance with an eigenvalue of 1.33838. Comp1 explained 22.31% of the total variance, indicating its significance in capturing the variability in the risk governance characteristics. The subsequent components, Comp2 to Comp6, accounted for decreasing proportions of the variance.

The loadings of the variables on the principal components provide insights into their contribution to the overall structure. Comp1 has a negative loading for CRO, CFO, and SENIOR.

1
2
3 Specifically, SENIOR has a pronounced negative loading of -0.4137 on Comp1, suggesting a
4 significant inverse relationship. CRO also has a negative relationship with Comp1, indicated
5 by its loading of -0.2171. However, CFO's contribution to Comp1 is minimal, as evidenced by
6 its loading of -0.0288. This makes Comp1 a suitable representative of the risk governance
7 characteristics in the subsequent regression analysis. The PCA findings in this study,
8 particularly regarding the significant variance captured by Comp1 and its loadings on CRO,
9 CFO, and SENIOR, align with the methodologies employed by Karyani et al. (2020) in their
10 study on the ASEAN-5 banking sector. They also utilized PCA to dissect risk governance
11 characteristics, finding key components that influence bank operations. The similarity in the
12 use of PCA and the identification of influential risk governance factors in both studies not only
13 validates the methodology but also reinforces the importance of these characteristics in risk
14 governance analysis within the banking sector.

15
16 Including Comp1 as an explanatory variable in the regression analysis facilitates the
17 examination of its relationship with RA, offering insights into the potential association
18 between risk governance characteristics and regulatory adjustments (Drake et al., 2006). By
19 utilizing Comp1, which emerged from the PCA as a comprehensive measure of risk
20 governance characteristics, the study can effectively capture the collective impact of CRO,
21 CFO, and SENIOR on regulatory adjustments. This approach, grounded in the PCA findings,
22 enhances the interpretability and efficiency of the regression model. It provides a nuanced
23 evaluation of the role played by risk governance characteristics in potentially influencing
24 regulatory adjustments, aligning with the broader research context highlighted by Srivastav
25 and Hagendorff (2016).

26
27 The PCA methodology in this study not only aligns with the approach taken by Karyani
28 et al. (2020) but also extends it by offering unique insights into the role of senior directors in
29 risk governance. While Karyani et al. (2020) laid the groundwork for understanding risk
30 governance in the ASEAN-5 banking sector, this study further explores how specific
31 components like senior director roles uniquely contribute to the dynamics of risk governance
32 in OECD public commercial banks. This distinction highlights the study's contribution to the
33 broader discourse on risk governance, enhancing the understanding of its multifaceted nature
34 in different banking contexts.

35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
[insert tables IV-a, IV-b, and IV-c here]

4.4. *Main Regression Analysis*

The main regression analysis results provide important insights into the relationship between the Risk Governance Index (RGI), represented by Comp1, and regulatory adjustments. The regression model incorporated the RGI, capturing the collective influence of risk governance characteristics, along with control variables such as CEOAD, BS, and SIZE. The coefficient for RGI was statistically significant and negative (-18,760.77, $p < 0.05$), indicating that a higher score on RGI, reflecting stronger risk governance practices associated with CRO, CFO, and SENIOR, is linked to lower levels of regulatory adjustments. This association remains robust even when controlling for CEOAD, BS, and SIZE, suggesting that risk governance characteristics, as represented by RGI, are associated with lower levels of regulatory adjustments, even after accounting for other control variables (Srivastav and Hagendorff, 2016). The negative relationship between the RGI and regulatory adjustments, as indicated by the significant coefficient in the regression analysis, resonates with the findings of Srivastav and Hagendorff (2016). They explored similar dynamics in the context of bank risk-taking behaviors and governance. The alignment of these results with their study provides a broader validation of the hypothesis that stronger risk governance practices, particularly those characterized by CRO, CFO, and SENIOR roles, are instrumental in reducing the need for regulatory adjustments. This study extends these insights by demonstrating how such governance characteristics specifically impact regulatory adjustments in the context of OECD public commercial banks, thereby contributing to the ongoing discourse on effective risk governance and regulatory compliance.

These findings offer empirical evidence supporting the hypothesis that risk governance characteristics, as represented by the RGI, are associated with regulatory adjustments. This study carefully considers the fixed-effects modeling approach to address potential endogeneity. This method controls for unobserved heterogeneity that could bias estimates. Incorporating fixed effects for banks and time, the model accounts for unobserved, bank-specific factors and time-related effects that could influence the dependent variable, enhancing the credibility of the findings. Such methodological consideration ensures the robustness of results and mitigates the risk of endogeneity. The negative coefficient for RGI suggests that strong risk governance practices, particularly those characterized by the presence of a CRO, CFO, and SENIOR, are linked with fewer regulatory adjustments. This

1
2
3 association underscores the importance of effective risk governance in aligning financial
4 statements with regulatory standards and potentially reducing the frequency of adjustments
5 required by regulatory bodies like the Bank for International Settlements (BIS). The specific
6 mention of CRO, CFO, and SENIOR is due to their significant loadings in the PCA, indicating
7 their pivotal role in the overall risk governance framework and its impact on regulatory
8 compliance.
9
10
11
12
13
14
15

16 [insert table V here]
17
18

19 4.5. *Sensitivity Analysis* 20 21 22

23 The results of the sensitivity analysis, robust to heteroskedasticity using bootstrap
24 replication, provide additional insights into the relationship between risk governance
25 characteristics and regulatory adjustments. The analysis focused on TIER1 as the dependent
26 variable. The coefficient for RGI remains positive (0.0074) in the sensitivity analysis, but it
27 does not achieve statistical significance at the conventional level ($p < 0.05$). However, the
28 coefficient is marginally significant at a 10% significance level ($p < 0.10$). While the bootstrap
29 results do not strongly confirm the main regression findings, they suggest a consistent
30 positive association between RGI and TIER1. The statistical significance of this association is
31 not firmly established based on the available data, but the consistent direction of the
32 coefficient across the bootstrap replications suggests a tendency towards a positive
33 relationship. These findings indicate an association between risk governance characteristics,
34 as represented by RGI, and the TIER1 for banks. However, it's important to note that this does
35 not imply a direct causal relationship. In the sensitivity analysis, the positive coefficient for
36 Comp1 suggests a potential association between TIER1 and the risk governance
37 characteristics. Specifically, while the RC shows a positive influence on TIER1, the roles of CRO,
38 CFO, and Senior Directors might have inverse effects. However, given the nature of sensitivity
39 analyses, these findings should be interpreted with caution, as they are meant to test the
40 robustness of our main regression results rather than establish definitive relationships.
41 Caution is exercised in interpreting these results, as the statistical significance of the
42 association is not firmly established. Further research with a larger sample size may be
43 necessary to obtain more conclusive evidence on the relationship between risk governance
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 characteristics and the regulatory capital ratio. It's pertinent to note that while this study
4 delves into the relationship between risk governance characteristics and regulatory
5 adjustments,
6
7

8
9 The sensitivity analysis, robust to heteroskedasticity using bootstrap replication,
10 provides additional insights into the relationship between risk governance characteristics and
11 the TCR. The coefficient for RGI in the main regression analysis remains statistically significant
12 and negative (-0.0585, $p < 0.05$) even after accounting for potential variations in the
13 estimation.
14
15
16
17

18 The negative association between RGI and TCR suggests that there's a correlation
19 between risk governance characteristics, as captured by RGI, and the overall capital adequacy
20 of banks, as reflected by the total capital ratio. This indicates that while risk governance
21 characteristics may be associated with higher tier 1 capital, which primarily consists of a
22 bank's core capital, they may not necessarily correlate with tier 2 capital, which includes
23 supplementary capital like subordinated debt and loan-loss reserves, or other components of
24 the total capital.
25
26
27
28
29

30 The bootstrap results further support the main regression findings, confirming the
31 stability of the negative coefficient for RGI across the bootstrap replications. This consistency
32 strengthens the evidence that risk governance characteristics have a limited influence on the
33 TCR of banks.
34
35
36
37

38 These findings suggest that risk governance characteristics may play a more significant
39 role in enhancing the core capital component (tier 1 capital) of banks, while their impact on
40 other components, such as tier 2 capital, may be limited. It is essential to consider additional
41 factors that influence the TCR beyond risk governance characteristics, as they may contribute
42 to a more comprehensive understanding of the bank's overall capital structure.
43
44
45
46

47 In the sensitivity analysis, the exploration of the relationship between risk governance
48 characteristics and regulatory capital ratios, as seen through the lens of RGI's impact on TIER1
49 and TCR, offers a nuanced perspective on governance practices. This aligns with and extends
50 the findings of Karyani et al. (2020), who examined the influence of risk governance and
51 market competition on banks' operational risk disclosure quality in the ASEAN-5 banking
52 sector. Their study underscores the broad significance of risk governance in banking and the
53 interplay between governance and market factors, a theme that resonates with the current
54 study's focus on regulatory capital ratios.
55
56
57
58
59
60

[insert table VI here]

4.6. Discussion

The results of the main regression analysis and sensitivity analysis provide valuable insights into the relationship between risk governance characteristics and regulatory adjustments in public commercial banks within the OECD. The findings suggest that risk governance characteristics, particularly those represented by CRO, CFO, and SENIOR, play a crucial role in mitigating regulatory adjustments and ensuring regulatory compliance. The negative associations observed in the correlation analysis (Section 4.2, Table III) and regression analysis indicate that a stronger presence of these risk governance characteristics is associated with lower levels of regulatory adjustments. This supports the hypothesis that effective risk governance practices contribute to the stability and reputation of public commercial banks within the OECD. While the direct impact on stability and reputation is beyond the scope of this study, it's evident that effective risk governance practices can influence regulatory adjustments in public commercial banks within the OECD. As highlighted by Srivastav and Hagendorff (2016), governance mechanisms play a crucial role in shaping bank risk-taking behaviors, emphasizing the need for internal governance mechanisms that reflect the needs of various stakeholders to ensure financial stability.

These findings are consistent with the earlier discussion emphasizing the significance of risk governance roles, particularly the roles of CRO, CFO, and SENIOR, in influencing regulatory adjustments. This alignment with previous research, such as that by Stolz et al. (2003), further underscores the importance of these roles in enhancing risk management practices within public commercial banks. The results also align with the principles set out in regulatory frameworks that emphasize risk governance and regulatory compliance. Specifically, the Basel III framework, introduced by the Basel Committee on Banking Supervision, focuses on strengthening bank capital requirements and introducing new regulatory requirements on bank liquidity and bank leverage. These measures are designed to enhance the resilience of the banking sector and reduce the risk of systemic failures. While this study does not directly address the concept of "stability," the findings do shed light on

1
2
3 the relationship between risk governance characteristics and regulatory adjustments in public
4 commercial banks.
5

6
7 The sensitivity analysis, as presented in Table VI, was conducted to assess how the
8 main results with the RA variable might change if the dependent variable is altered to TIER1
9 or TCR. For the models with TIER1 as the dependent variable, there's a positive association
10 with the RGI variable, indicating that an enhancement in risk governance correlates with an
11 increase in TIER1. However, this association is significant at the 10% level in Model 1.
12 Additionally, the SIZE variable shows a negative relationship with TIER1, significant at the 1%
13 level, suggesting that larger banks might have a lower TIER1. The CEOAD and BS variables do
14 not exhibit statistical significance in these models. It's essential to interpret these findings in
15 the context of the broader research and consider the implications for risk governance
16 practices in public commercial banks within the OECD. Future research, especially studies like
17 that of Ekawati et al. (2021) which delve into the interplay between risk management, capital
18 structure, and corporate governance, can offer deeper insights into the influence of risk
19 governance characteristics on banks' financial performance and capital structure.
20
21

22
23 While the main regression results, as presented in Table V, indicate a negative
24 association between RGI and RA, the sensitivity analysis for TCR, robust to heteroskedasticity
25 using bootstrap replication, also reveals a negative association between RGI and TCR. This
26 contrast with the positive association observed for TIER1 underscores the nuanced impact of
27 risk governance on different components of banks' capital structure and regulatory
28 adjustments. This suggests that risk governance characteristics, as represented by RGI, may
29 have a differential impact on different components of the bank's capital structure. Further
30 research is necessary to explore the specific reasons behind this negative association and its
31 implications for bank risk management and capital adequacy.
32
33

34
35 Overall, the results of this study contribute to the existing literature on risk
36 governance, regulatory compliance, and their relationship with regulatory adjustments in
37 public commercial banks within the OECD. The findings highlight the importance of effective
38 risk governance practices in mitigating regulatory adjustments and maintaining financial
39 stability. In line with the insights from Francis and Osborne (2012), who examined the effects
40 of regulatory capital requirements on bank behavior in the UK, policymakers and bank
41 regulators can use these findings to inform their efforts in strengthening risk governance
42 frameworks and promoting regulatory compliance in the banking sector. This is especially
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 pertinent given the ongoing debates surrounding the design and calibration of international
4 capital standards.
5

6 7 **5. Conclusion** 8 9

10 Findings from the analysis support the hypothesis that the presence of specific roles,
11 namely a CRO, CFO, and SENIOR, have a significant negative association with regulatory
12 adjustments. As clarified in section 4.6, along with the overall risk governance characteristics,
13 these three roles in particular stand out as significant based on their loadings in the PCA. This
14 implies that stronger risk governance, represented by these characteristics, can reduce the
15 level of regulatory adjustments in banks. While the study does not directly address financial
16 stability, the observed reduction in regulatory adjustments suggests a more compliant and,
17 by implication, a potentially more stable banking environment. This conclusion provides
18 valuable insights for policymakers and bank regulators, as they can focus their efforts on
19 enhancing these specific risk governance practices to promote regulatory compliance and
20 indirectly contribute to the stability of the banking sector.
21
22

23 However, while the findings are consistent and hold true across various tests and
24 conditions, it is crucial to acknowledge the limitations of the study. The sample size and
25 dataset used in this study might limit the generalizability of the findings. A larger sample size,
26 a more diverse set of data, or focusing on a specific group of banks, might yield different
27 results. It is also important to remember that correlation does not imply causation, and while
28 the study found associations, more research is required to establish causal relationships.
29
30

31 This study enriches the literature on risk governance and regulatory compliance in
32 OECD public commercial banks. It reveals the impact of roles like CRO, CFO, and SENIOR on
33 regulatory adjustments, offering insights for future research and policy-making. While not
34 directly addressing financial stability, the findings suggest effective risk governance may
35 enhance regulatory compliance and indirectly indicate a more stable banking environment.
36
37

38 In terms of future research, it would be valuable to delve deeper into the specific
39 mechanisms through which risk governance characteristics influence different components
40 of a bank's capital structure. This could provide more granular insights into the dynamics of
41 risk governance and its implications for bank performance. The study's conclusions
42 underscore the significance of specific risk governance roles in reducing regulatory
43 adjustments, suggesting a more compliant and potentially stable banking environment. These
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 insights offer practical implications for policymakers and bank regulators, highlighting the
4 importance of enhancing risk governance practices, particularly focusing on roles like CRO,
5 CFO, and SENIOR, to promote regulatory compliance and indirectly support banking sector
6 stability. The limitations of the study, such as sample size and dataset scope, point towards
7 the need for further research to generalize these findings and establish causal relationships.
8 Future research should explore the mechanisms through which risk governance
9 characteristics influence bank capital structure and performance, as well as the collective
10 impact of various governance elements on regulatory adjustments and stability. This study
11 contributes to the literature on risk governance and regulatory compliance, particularly in
12 OECD public commercial banks, and provides a foundation for future policy-making and
13 research initiatives. By suggesting directions for further investigation, it bridges the gap
14 between theory and practice, offering a path for applying these insights in real-world banking
15 and regulatory scenarios. Additionally, considering other risk governance characteristics not
16 covered in this study could offer a more comprehensive view of the landscape. Exploring the
17 interaction and synergy effects between different risk governance characteristics might also
18 shed light on how these elements collectively impact regulatory adjustments and overall bank
19 stability. We encourage researchers to take these suggestions into account as they continue
20 to expand the knowledge base in this domain.
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

References

- Abdel-Wanis, E. (2021), *"The impact of regulatory capital and bank characteristics on the relationship between bank competition and risk taking in the banking system"*, Journal of Accounting, Business and Management (JABM), Vol. 28 No. 1, pp. 87-100.
- Abou-El-Sood, H. and Shahin, R. (2023), *"Bank competition, regulatory capital, and risk taking: international evidence"*, Managerial Finance, Vol. 49 No. 10, pp. 1614-1640. <https://doi.org/10.1108/MF-06-2022-0277>
- Adams, R., and Ferreira, D. (2009), *"Women in the boardroom and their impact on governance and performance"*, Journal of Financial Economics, Vol. 94, pp. 291–309.
- Aebi, V., Sabato, G. and Schmid, M. (2012), *"Risk management, corporate governance, and bank performance in the financial crisis"*, Journal of Banking & Finance, Vol. 36, pp. 3213–3226.
- Agarwal, S., and Wang, F.H. (2009), *"Perverse incentives at the banks? Evidence from a natural experiment"*, Working Paper 2009–08. Federal Reserve Bank of Chicago.
- Andres, P. de. and Vallelado, E. (2008), *"Corporate governance in banking: The role of the board of directors"*, Journal of Banking and Finance, Vol. 32 No. 12, pp.2570–2580. <https://doi.org/10.1016/j.jbankfin.2008.05.008>
- Bargeron, L.L. Lehn, K.M. and Zutter, C.J. (2010), *"Sarbanes-Oxley and corporate risk-taking"*, Journal of Accounting and Economics, Vol. 49 No. 1-2, pp. 34-52.
- Basel Committee on Banking Supervision. (2011), *"Basel III: A global regulatory framework for more resilient banks and banking systems"*, Bank for International Settlements.
- BCBS (2015), *"Corporate Governance Principles for Banks, Bank for International Settlements"*, available at: <https://www.bis.org/bcb/publ/d328.pdf> (accessed 21 June 2023).
- Berger, A. N., Kick, T., and Schaeck, K. (2014), *"Executive board composition and bank risk taking"*, Journal of Corporate Finance, Vol. 28, pp. 48-65.
- Birindelli, G. and Ferretti, P. (2013), *"Compliance function in Italian banks: organizational issues"*, Journal of Financial Regulation and Compliance, Vol. 21 No. 3, pp. 217–240.
- Birindelli, G. and Ferretti, P. (2008), *"Compliance risk in Italian banks: the results of a survey"*, Journal of Financial Regulation and Compliance, Vol. 16 No. 4, pp. 335–351.
- BIS (2019), *"CAP30, Regulatory Adjustments"*, available at: https://www.bis.org/basel_framework/chapter/CAP/30.htm
- Brancato, C., Tonello, M., Hexter, E., and Newman, K. R. (2006), *"The role of US corporate boards in enterprise risk management"*, The Conference Board Research Report, No. R-1390-06-RR.

- 1
2
3 Caprio, G. and Levine, R. (2002), *"Corporate governance in finance: Concepts and*
4 *international observations"*, in *Financial Sector Governance: The Roles of the Public*
5 *and Private Sectors*, pp.17-50.
- 6
7 Chao, Y.-S. and Wu, C.-J. (2017), *"Principal component-based weighted indices and a*
8 *framework to evaluate indices: Results from the Medical Expenditure Panel Survey*
9 *1996 to 2011"*, *PLoS One*, Vol. 12 No. 9, e0183997–e0183997.
- 10
11 DIRECTIVE 2013/36/EU of the European Parliament and of the Council of 26 June 2013,
12 available at: [https://eur-lex.europa.eu/legal-](https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32013L0036)
13 [content/EN/ALL/?uri=CELEX:32013L0036](https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32013L0036) (accessed 21 June 2023).
- 14
15
16 Dodd-Frank Wall Street Reform and Consumer Protection Act, Public Law 203, U.S. Statutes
17 at Large 124 (2010): pp. 1376-2223.
- 18
19 Drake, L., Hall, M.J. and Simper, R. (2006), *"The impact of macroeconomic and regulatory*
20 *factors on bank efficiency: A non-parametric analysis of Hong Kong's banking*
21 *system"*, *Journal of Banking and Finance*, Vol. 30 No. 5, pp.1443-1466.
- 22
23 Ekawati, N., Purwohedi, U. and Warokka, A. (2021), *"The Influence of Risk Management,*
24 *Third-Party Funds and Capital Structure on Banking Sector Financial Performance in*
25 *Indonesia and Thailand with Corporate Governance as Moderating Variable in 2015-*
26 *2019"*, *Oblik i Finansi*, No. 94, pp.71-80.
- 27
28 Erin, O., Asiriwa, O., Olojede, P., Ajetunmobi, O. and Usman, T. (2018), *"Does risk*
29 *governance impact bank performance? Evidence from the Nigerian banking sector"*,
30 *Academy of Accounting and Financial Studies Journal*, Vol. 22 No. 4, pp.1-14.
- 31
32 Erkens, D. H., Hung, M., and Matos, P. (2012), *"Corporate governance in the 2007–2008*
33 *financial crisis: Evidence from financial institutions worldwide"*, *Journal of Corporate*
34 *Finance*, Vol. 18, pp. 389–411.
- 35
36
37 Fiene, R. (2016), *"A Treatise on the Theory of Regulatory Compliance"*, *Journal of Regulatory*
38 *Science*, Vol. 7 No. 1-3.
- 39
40 Francis, B. B., and Osborne, M. (2012), *"Capital requirements and bank behavior in the UK:*
41 *Are there lessons for international capital standards?"*, *Journal of Banking and*
42 *Finance*, Vol. 36 No. 3, pp. 803-816.
- 43
44 Gontarek, W., and Belghitar, Y. (2018), *"Risk governance: Examining its impact upon bank*
45 *performance and risk-taking"*, *Financial Markets, Institutions and Instruments*, Vol.
46 27 No. 5, pp. 187-224.
- 47
48 Gropp, R., Mosk, T., Ongena, S., Simac, I., and Wix, C. (2021), *"Supranational rules, national*
49 *discretion: Increasing versus inflating regulatory bank capital?"*, *Journal of Financial*
50 *and Quantitative Analysis*, pp. 1-58.
- 51
52 Karyani, E., Kolade, O. and Dewo, S.A. (2020), *"Risk governance, market competition and*
53 *operational risk disclosure quality: a study of the ASEAN-5 banking sector"*, *Journal of*
54 *Operational Risk*, Vol. 16 No. 2.
- 55
56 Kirkpatrick, G. (2009), *"The corporate governance lessons from the financial crisis"*, *OECD*
57 *Journal: Financial Market Trends*, Vol. 2009 No. 1, pp.61-87.
- 58
59
60

- 1
2
3 Lingel, A. and Sheedy, E. A. (2012), *"The Influence of Risk Governance on Risk Outcomes –*
4 *International Evidence"*, Macquarie Applied Finance Centre Research Paper 37,
5 available at SSRN: <https://ssrn.com/abstract=2187116> (accessed 21 June 2023).
6
7 Lubberink, M. J. P., and Willett, R. J. (2023), *"How sensitive are bank market values to*
8 *regulatory adjustments of capital? "*, Available at SSRN 4172870.
9
10 McNulty, T., Florackis, C., and Ormrod, P. (2013), *"Boards of directors and financial risk*
11 *during the credit crisis"*, *Corporate Governance: An International Review*, Vol. 21 No.
12 1, pp. 58–78.
13
14 Minton, B. A., Taillard, J. P., and Williamson, R. (2014), *"Financial Expertise of the Board, Risk*
15 *Taking, and Performance: Evidence from Bank Holding Companies"*, *Journal of*
16 *Financial and Quantitative Analysis*, Vol. 49 No. 2, pp. 351–380.
17
18 Mongiardino, A., and Plath, C. (2010), *"Risk governance at large banks: have any lessons*
19 *been learned? "*, *Journal of Risk Management in Financial Institutions*, Vol. 3, pp.
20 116–123.
21
22
23 Nguyen, Q. K. and Dang, V. C. (2022), *"The impact of risk governance structure on bank risk*
24 *management effectiveness: evidence from ASEAN countries"*, *Heliyon*, Vol. 8 No. 10,
25 e111192–e111192. <https://doi.org/10.1016/j.heliyon.2022.e111192>.
26
27 Quintyn, M. and Chenard, K. (2004), *"Does Regulatory Governance Matter for Financial*
28 *System Stability? An Empirical Analysis"*, IMF Working Paper No. 04/89, available at
29 SSRN: <https://ssrn.com/abstract=878912> (accessed 21 June 2023).
30
31 Rachdi, H., and Ben Bouheni, F. (2016), *"Revisiting the effect of regulation, supervision, and*
32 *risk on banking performance: Evidence from European banks based on PSTR model"*,
33 *Journal of Financial Regulation and Compliance*, Vol. 24 No. 1, pp. 24–40.
34
35 Srivastav, A. and Hagendorff, J. (2016), *"Corporate governance and bank risk-taking"*,
36 *Corporate Governance: An International Review*, Vol. 24 No. 3, pp.334-345.
37
38 Stock, J.H., and Watson, M.W. (2008), *"Heteroskedasticity-Robust Standard Errors for Fixed*
39 *Effects Panel Data Regression"*, *Econometrica*, Vol. 76 No. 1, pp. 155–174.
40
41 <https://doi.org/10.1111/j.0012-9682.2008.00821.x>.
42
43 Stolz, S., Heid, F., and Porath, D. (2003), *"Does capital regulation matter for bank behavior?*
44 *Evidence for German savings banks"*, Kiel Working Paper, No. 1192, Kiel Institute for
45 the World Economy (IfW), Kiel.
46
47 Streukens, S., and Leroi-Werelds, S. (2016), *"Bootstrapping and PLS-SEM: A step-by-step*
48 *guide to get more out of your bootstrap results"*, *European Management Journal*,
49 Vol. 34 No. 6, pp. 618-632.
50
51 Van Greuning, H. and Bratanovic, S.B. (2020), *"Analyzing Banking Risk: A Framework for*
52 *Assessing Corporate Governance and Risk Management"*, World Bank Publications.
53
54 Yao, J., Hisham Noori Hussain, A. H., Waleed Noori, H., and Haider Noori, H. (2023),
55 *"Comparative Analysis of the Global Banking System A Study of the American and*
56 *Chinese Banking Regulations"*, *International Journal on Economics, Finance and*
57 *Sustainable Development*, Vol. 5 No. 11, pp. 73-82.
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Journal of Financial Regulation and Compliance

1
2
3
4
5 **Tables**
6
7

8 Table I – Variable definitions
9

Research Variables	Measurements
Dependent	
RA ^a	Regulatory adjustments (in 1000 EUR)
TIER1 ^b	Tier 1 capital / Risk Weighted assets
TCR ^c	Total capital / Risk Weighted assets
Independent	
RGI	Risk Governance Index, derived from a Principal Component Analysis (PCA) of the following variables: RC, CRO, CFO, TITLE, AGE, and BI. The first principal component (COMP1) from the PCA is selected as the RGI, providing an aggregated view of the bank's risk governance practices.
RC	if bank has Risk Committee (1) and if not (0)
CRO	Binary variable indicating the presence (1) or absence (0) of a Chief Risk Officer in the bank, irrespective of their board membership status.
CFO	Binary variable indicating the presence (1) or absence (0) of a Chief Financial Officer in the bank, irrespective of their board membership status.
TITLE	if director holds PhD degree (1) and if not (0)
SENIOR	if director's age is between 66–75 (1) and if not (0)
BI	if Director is independent Independent directors
Control	
CEOAD	if Chief Executive Officer has an additional position (1) and if not (0)
BS	Total number of directors on board
SIZE	Total Assets (in 1000 EUR)
LNSIZE	Natural logarithm of the Total Assets

^a Regulatory Adjustments (RA): These are specific modifications made to a bank's assets and liabilities as mandated by the Bank for International Settlement (BIS) under the CAP30 guidelines. The adjustments include, but are not limited to, intangible assets, deferred tax assets, and changes in own credit risk on fair valued liabilities. The primary purpose of these adjustments is to present a more accurate view of a bank's Common Equity Tier 1 capital. Essentially, they ensure that stakeholders have a transparent view of the bank's core capital by accounting for certain assets and liabilities that might otherwise distort this view. When calculating their own funds, banks must consider all assets measured at fair value and make necessary deductions from Common Equity Tier 1 capital for any additional value adjustments.

^b According to the Basel Committee on Banking Supervision, the minimum Tier One ratio has to achieve 6 % by 1 January 2015 (the implementation phase started in January 2013). For the previous versions of Basel, the minimum percentage required was 4 % (Basel Committee on Banking Supervision, 2011).

^c Total capital / Risk Weighted assets. According to the Basel Committee on Banking Supervision, the minimum total capital ratio has to remain at 8%

58
59
60

Table II

Descriptive Statistics

VARIABLE	OBS	MEAN	STD. DEV.	MIN	MAX
RA	2,740	548,608 €	4,100,070 €	-6,601,000 €	27,400,000 €
TIER1	1,872	13.24027	3.202067	8.8	32.6
TCR	14,596	15.23164	3.44537	9.89	20.9
RC	14,596	0.1961496	0.3970967	0	1
CRO	14,596	0.0055495	0.0742903	0	1
CFO	14,596	0.0277473	0.1642537	0	1
TITLE	14,596	0.1361332	0.3429417	0	1
SENIOR	14,596	0.3013154	0.4588451	0	1
BI	14,596	0.5059605	0.4999816	0	1
CEOAD	14,596	0.0799534	0.2712304	0	1
BS	14,595	14.68284	5.097506	5	32
SIZE	14,555	8,930,000,000 €	85,700,000,000 €	4,760 €	1,770,000,000,000 €
LNSIZE	14,555	18.64115	2.606162	8.468085	28.20256

Table II presents the descriptive statistics for the variables used in the study, including the number of observations (Obs), mean, standard deviation (Std. Dev.), minimum (Min), and maximum (Max) values for each. The variables encompass key aspects of the research, such as Regulatory Adjustments (ra, in 1000 EUR), TIER1, TCR, RC, CRO, CFO, TITLE, SENIOR, BI, CEOAD, BS, SIZE (in 1000 EUR), and LNSIZE. These statistics illustrate the data spread and central tendencies, providing a comprehensive understanding of the dataset.

The dataset, comprising 14,596 bank-director years from 2001 to 2020, reflects individual directors' experiences within banks over this period, offering a detailed "bank-director years" level of analysis. This approach enhances the understanding of the interplay between risk governance characteristics and regulatory adjustments.

Notably, the RGI (Risk Governance Index) is not included in this table. The RGI, derived through PCA, is a composite measure aggregating individual risk governance characteristics. It captures the shared variance of these characteristics, providing a consolidated measure of a bank's overall risk governance strength. As a derived measure, the RGI is crucial in regression analysis for assessing the collective impact of risk governance characteristics on regulatory adjustments.

The inclusion of both size and lnsize (natural logarithm of size) in the analysis serves distinct purposes. Size represents the actual size of the bank, assessing the direct linear relationship with the dependent variables. In contrast, lnsize captures non-linear relationships and the percentage change in the dependent variable for a 1% change in the bank's size. This dual approach ensures a comprehensive understanding of the impact of bank size on the dependent variables, capturing both linear and non-linear relationships and reinforcing the robustness of the findings.

Table III Correlation

	RA	TIER1	TCR	RC	CRO	CFO
RA	1.00					
TIER1	-0.21***	1.00				
TCR	-0.16***	0.54***	1.00			
RC	0.09**	0.04	0.06*	1.00		
CRO	-0.06*	0.08*	0.02	-0.07*	1.00	
CFO	-0.01	0.13***	0.11***	-0.07*	-0.03	1.00
TITLE	-0.05	0.15***	0.10**	0.08**	0.05	-0.02
SENIOR	0.00	-0.05	0.00	-0.06	0.03	0.05
BI	0.29***	-0.16***	-0.04	0.28***	-0.16***	0.00
CEOAD	0.03	-0.09**	-0.02	-0.04	-0.04	-0.09**
BS	-0.32***	0.11***	-0.04	-0.14***	0.12***	-0.01
SIZE	-0.22***	0.24***	0.14***	-0.09**	0.04	-0.02

	TITLE	SENIOR	BI	CEOAD	BS	SIZE
TITLE	1.00					
SENIOR	-0.07*	1.00				
BI	0.11***	-0.05	1.00			
CEOAD	-0.02	0.00	-0.11***	1.00		
BS	0.05	0.07*	-0.38***	-0.07*	1.00	
SIZE	0.08*	0.06	-0.12***	0.01	0.41***	1.00

"* p<0.05 ** p<0.01 *** p<0.001"

Note: Table III presents the correlation matrix of the variables utilized in the study. Each cell shows the Pearson correlation coefficient between pairs of variables, with significance levels marked as follows: * for p<0.05, ** for p<0.01, and *** for p<0.001. A negative correlation indicates an inverse relationship, while a positive correlation signifies a direct relationship. For instance, RA and TIER1 share a significant negative correlation of -0.21, suggesting that as RA increase, TIER1 tends to decrease, and vice versa. Understanding these correlations assists in the interpretation of the relationship dynamics among the various factors considered in this study.

Table IV-a PCA Eigenvalues

COMPONENT	EIGENVALUE	DIFFERENCE	PROPORTION	CUMULATIVE
COMP1	1.33838	0.305182	0.2231	0.2231
COMP2	1.0332	0.0285048	0.1722	0.3953
COMP3	1.00469	0.0437661	0.1674	0.5627
COMP4	0.960927	0.0455382	0.1602	0.7229
COMP5	0.915389	0.167977	0.1526	0.8754
COMP6	0.747412	.	0.1246	1

Note: Table IV-a presents the Eigenvalues obtained from the PCA. It showcases six components (COMP1 to COMP6), their respective Eigenvalues, the Difference in Eigenvalues between successive components, the Proportion of the total variance explained by each component, and the Cumulative proportion of explained variance up to each component. The table provides an overview of how much each component contributes to the total variability of the data. The cumulative proportion column gives a quick way to see how much total variance is accounted for as we consider more components. By the end of COMP6, all the variance in the data (100%) has been accounted for.

Table IV-b PCA Principal components (eigenvectors)

VARIABLE	COMP1	COMP2	COMP3	COMP4	COMP5	COMP6	UNEXPLAINED
RC_STD	0.5723	-0.0315	-0.2229	0.4185	0.2255	0.6291	0
CRO_STD	0.2171	-0.4719	0.4345	0.7178	-0.1218	-0.106	0
CFO_STD	0.0288	0.7367	0.5829	0.1277	-0.1906	0.2531	0
TITLE_STD	0.2653	-0.3137	0.6356	-0.4162	0.4996	0.0658	0
SENIOR_STD	0.4137	0.2899	-0.1306	0.2633	0.8028	-0.1183	0
BI_STD	0.6188	0.2262	0.026	0.2252	0.0622	-0.7146	0

Note: Table IV-b displays the Principal Components (PCs) or eigenvectors¹ for each variable obtained from the PCA, along with any unexplained variance. The table depicts the direction and magnitude of each variable's contribution to each component (COMP1 to COMP6). These components are linear combinations of the original variables, and each represents a specific aspect of the total variance present in the original data. The unexplained variance for all variables is zero, indicating that the PCA model fully represents the variability of all standardized variables.

¹ Note on the Similarity Between Table IV-b and Table IV-c:

Tables IV-b and IV-c both stem from the PCA process, and their values are intrinsically linked:

PCA Overview: PCA is employed to transform the original data variables into a set of new orthogonal variables, termed principal components. These components encapsulate the variance in the data, with the aim of reducing dimensionality while retaining as much information as possible.

Eigenvectors vs. Loadings: Table IV-b delineates the eigenvectors of each variable, reflecting the direction and magnitude of each variable's contribution to the principal components. Conversely, Table IV-c displays the loadings, signifying the correlation between the original variables and the principal components. Due to the nature of PCA, especially when standardized variables are utilized, the eigenvectors and loadings often coincide, leading to the observed similarity in values across the two tables.

Incorporating Unexplained Variance: A distinguishing feature of Table IV-b is the 'Unexplained' column, which sheds light on any variance not captured by the principal components. In this dataset, the unexplained variance for all variables is zero, indicating that the PCA has comprehensively represented the variability of the standardized variables.

In essence, the congruence between Tables IV-b and IV-c is anticipated and aligns with standard PCA outputs. The addition of the 'Unexplained' column in Table IV-b provides an extra layer of understanding, ensuring that readers grasp the full scope of the data's dimensionality reduction.

In the context of the table "Table IV-b PCA Principal components (eigenvectors)," the value "0.5723" under "COMP1" for the variable "RC_STD" represents the eigenvector coefficient for that specific variable in relation to the first principal component (COMP1).

Table IV-c PCA Scores

Scoring coefficients

sum of squares(column-loading) = 1

VARIABLE	COMP1	COMP2	COMP3	COMP4	COMP5	COMP6
RC_STD	0.5723	-0.0315	-0.2229	0.4185	0.2255	0.6291
CRO_STD	-0.2171	-0.4719	0.4345	0.7178	-0.1218	-0.106
CFO_STD	-0.0288	0.7367	0.5829	0.1277	-0.1906	0.2531
TITLE_STD	0.2653	-0.3137	0.6356	-0.4162	0.4996	0.0658
SENIOR_STD	-0.4137	0.2899	-0.1306	0.2633	0.8028	-0.1183
BI_STD	0.6188	0.2262	0.026	0.2252	0.0622	-0.7146

Note: Table IV-c presents the scoring coefficients, also known as loadings, obtained from the PCA. These loadings signify the correlation between the original variables (RC_STD to BI_STD) and the derived principal components (COMP1 to COMP6). High absolute values of loadings (closer to -1 or 1) indicate that the respective variable contributes significantly to the corresponding component. For instance, RC_STD has a high loading of 0.5723 on COMP1, suggesting a significant positive relationship between these. Negative loadings indicate an inverse relationship. The sum of squares of column-loadings equals 1, indicating that the components fully account for the variance in the data.

Table V Regression (main results)

VARIABLES	(1) RA	(1a) RA-Bootstrapped
RGI	-18,760.7750** (9,097.2082)	-18,760.7750** (8,448.8366)
CEOAD	-1,101.3568 (29,493.7221)	-1,101.3568 (28,696.5639)
BS	-12,491.6684 (101,654.2046)	-12,491.6684 (104,146.9859)
SIZE	0.0044** (0.0016)	0.0044* (0.0026)
CONSTANT	-3.5066e+06* (2040512.1295)	-3.5066e+06 (3586194.8452)
Observations	2,740	2,740
Adjusted R-squared	0.8951	0.8951
Bank FE	YES	YES
Year FE	YES	YES
Clusters	Bank	Bank

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Table V showcases the primary outcomes of the regression analysis for this study. Two models, (1) and (1a), are presented, both using RA as the dependent variable and RGI as a key independent variable. Model (1) utilizes a standard regression method, while Model (1a) employs bootstrapped estimates for robustness verification.

The negative coefficient for RGI indicates a statistical association where higher values of risk governance (RGI) correspond with decreased regulatory adjustments. This association is statistically significant at the 5% level in both models. However, it's crucial to understand that this association does not imply that improving risk governance directly causes a reduction in regulatory adjustments. The relationship merely suggests that the two variables move in opposite directions.

The SIZE variable's positive coefficient suggests that larger banks tend to have increased regulatory adjustments. This finding is significant at the 5% level in Model 1 and the 10% level in Model 1a. Other variables, such as CEOAD and BS, do not show statistically significant coefficients, indicating their potential limited impact on regulatory adjustments.

The models account for bank and year fixed effects, controlling for unobserved bank-specific attributes and common time-related effects. Robust standard errors, clustered by bank, are used to mitigate potential issues with heteroskedasticity and autocorrelation. The models' adjusted R-squared value of 0.8951 indicates that the included variables account for approximately 89.51% of the variability in regulatory adjustments. The high adjusted R-squared value in the regression models is influenced by the inclusion of the RGI variable, derived from COMP1 of the PCA analysis. COMP1 captures a significant portion of the variance from the original dataset, contributing to the model's explanatory power. However,

the overall model specification and other variables also play a role in achieving this high R-squared value.

Table VI Sensitivity Analysis

VARIABLES	(2) TIER1	(2a) TIER1-Bootstrapped	(3) TCR	(3a) TCR-Bootstrapped
RGI	0.0074* (0.0043)	0.0074 (0.0050)	-0.0585** (0.0284)	-0.0585** (0.0271)
CEOAD	0.0075 (0.0180)	0.0075 (0.0196)	-0.1094* (0.0620)	-0.1094 (0.0713)
BS	0.0176 (0.0583)	0.0176 (0.0764)	0.0127 (0.0545)	0.0127 (0.0598)
SIZE	-0.0000*** (0.0000)	-0.0000 (0.0000)		
LNSIZE			-2.1427*** (0.6558)	-2.1427*** (0.6827)
CONSTANT	14.6206*** (1.3686)	14.6206*** (1.7315)	54.9984*** (12.1721)	54.9984*** (12.4878)
Observations	1,872	1,872	14,554	14,554
Adjusted R-squared	0.9526	0.9526	0.6406	0.6406
Bank FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Clusters	Bank	Bank	Bank	Bank

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Table VI displays the results of the sensitivity analysis, with four models presented. The first two models have TIER1 as the dependent variable while the next two use TCR. Each pair includes a conventional regression model and a bootstrapped model for robustness checking. Models (2) and (2a) have 1,872 observations, while models (3) and (3a) have 14,554. This variation in sample size is a result of merging data with the BoardEx database and reflects the differing availability of overlapping data points. Such differences in sample sizes across models are typical in regression analysis, underscoring the importance of understanding the data sources and the rationale behind each model's construction.

For the models with TIER1 as the dependent variable, the RGI variable shows a positive association, indicating that higher values of risk governance (RGI) are correlated with higher TIER1 values. It's important to note that this is an observed association and does not imply that changes in risk governance directly cause changes in TIER1. This association is statistically significant at the 10% level in Model 1. The SIZE variable is negatively associated with TIER1 and is significant at the 1% level, suggesting that, on average, larger banks have lower TIER1 values. The CEOAD and BS variables are not statistically significant.

For the models with TIER1 as the dependent variable, the RGI variable has a positive association, suggesting that an improvement in risk governance is correlated with a higher TIER1. However, this result is only significant at the 10% level in Model 1. The SIZE variable

1
2
3 has a negative association with TIER1 and is significant at the 1% level. This implies that larger
4 banks may tend to have a lower TIER1. The CEOAD and BS variables are not statistically
5 significant.
6

7 In the models with TCR as the dependent variable, the RGI variable shows a negative
8 association. This suggests that higher values of risk governance (RGI) are correlated with
9 lower total capital ratios (TCR). It's important to clarify that this is an observed correlation
10 and does not imply that changes in risk governance directly cause changes in the total capital
11 ratio. This relationship is statistically significant at the 5% level. The CEOAD variable is
12 negative and significant at the 10% level, suggesting that banks with a CEO who is also the
13 chair of the board may have a lower total capital ratio. The LNSIZE variable, representing the
14 natural logarithm of the bank's size, has a negative coefficient and is significant at the 1%
15 level. This suggests that larger banks have a lower total capital ratio. The BS variable is not
16 statistically significant in these models.
17

18
19 All models include bank and year fixed effects, and the standard errors are clustered
20 at the bank level.
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1. Introduction

The primary objective of this study is to investigate the relationship between risk governance characteristics and regulatory adjustments in OECD public commercial banks, focusing on how these elements contribute to banking stability. Specifically, the research will analyze the implications of varying capital requirements as part of the sensitivity analysis, aiming to uncover how risk governance characteristics interact with these regulatory adjustments to affect the overall stability and efficiency of the banking sector.

Risk governance and regulatory adjustments are pivotal in maintaining the banking sector's stability and compliance. This paper primarily examines these aspects from the banks' perspective, focusing on the impact of risk governance on regulatory adjustments. In complex financial markets, banks, often guided by regulators, must establish robust risk governance frameworks to manage risks and maintain stakeholder trust (Andres and Vallelado, 2008; Caprio and Levine, 2002). Regulatory adjustments (BIS-CAP30, 2019), mandated by bodies like BCBS, 36/EU Directive (2013) and Dodd-Frank Act (2010), align banks' financial reporting with regulatory frameworks, ensuring stability (Van Greuning and Bratanovic, 2020). These adjustments, while corrective, can indicate deeper financial management issues, affecting stability and performance (Francis and Osborne, 2012). Understanding the interplay between risk governance and regulatory compliance is crucial for the banking sector's resilience and effectiveness.

This study explores the relationship between risk governance characteristics and regulatory adjustments in OECD public commercial banks. It distinguishes between banks' compliance and specific regulatory mandates, informed by Quintyn and Chenard (2004). Focusing on OECD standards, the research examines how governance impacts financial stability and performance. The findings contribute to understanding the role of regulatory governance in the banking sector, emphasizing its importance in maintaining financial system stability.

The primary objective of this research is to investigate the association between risk governance characteristics and regulatory adjustments in public commercial banks within the OECD. The study specifically evaluates the presence and impact of various risk governance roles, including Risk Committees (RC), Chief Risk Officers (CRO), Chief Financial Officers (CFO), PhD holders (TITLE), senior directors (SENIOR), and independent directors (BI), as outlined in

1
2
3 studies by Minton et al., 2014; Bargerion et al., 2010; Berger et al., 2014; Aebi et al., 2012;
4
5 Andres and Vallelado, 2008; Caprio and Levine, 2002. Furthermore, the study examines the
6
7 impact of risk governance on capital requirements, specifically the Tier 1 capital to Risk
8
9 Weighted assets ratio (TIER1) and total capital to Risk Weighted assets ratio (TCR), exploring
10
11 their effects on bank stability and performance (Francis and Osborne, 2012). To elucidate the
12
13 crucial link between risk governance and capital requirements, it is essential to understand
14
15 how they collectively influence banking stability. Effective risk governance directly impacts
16
17 the capital requirements of banks, playing a pivotal role in their financial resilience. In
18
19 particular, this study scrutinizes OECD public commercial banks, where the synergy of risk
20
21 governance and capital requirements is integral to the health of the banking sector. This
22
23 research aims to dissect this interplay, providing insights into its significance for banking
24
25 stability. This exploration is intended to provide insights into how risk governance can support
26
27 or influence regulatory adjustments within the banking sector.

27
28 The choice of OECD countries for this study is intentional. Their varied regulatory
29
30 frameworks make them an ideal context to explore the relationship between risk governance
31
32 and regulatory compliance. This approach not only fills a critical gap in existing research but
33
34 also provides valuable insights into the dynamics of banking regulation across different
35
36 economic environments, enhancing the study's originality and global relevance. Recognizing
37
38 the need for a more exhaustive investigation, this research extends its analysis to explore the
39
40 nuanced effects of risk governance roles, such as CRO and CFO, on regulatory adjustments
41
42 and bank stability. Employing methodologies like principal component analysis and regression
43
44 models, the study draws on a theory from corporate governance and financial regulation
45
46 literature to analyze how specific risk governance characteristics within OECD public
47
48 commercial banks relate to regulatory adjustments and their overall implications for banking
49
50 stability and performance.

49
50 This study not only investigates the association between risk governance
51
52 characteristics and regulatory adjustments in OECD public commercial banks but also delves
53
54 into how these factors interact with various elements of banks' capital structure, such as
55
56 TIER1 and TCR. The nuanced findings, especially the differential impacts observed in the
57
58 sensitivity analysis, underscore a novel contribution to the literature. By exploring these
59
60 complex relationships, the study offers fresh insights into the dynamics of risk governance

1
2
3 and its implications on financial stability, a topic less explored in existing research within the
4 context of OECD countries.
5

6
7 To achieve the outlined research objectives, a comprehensive research design has
8 been implemented, analyzing data from 14,596 bank-director years spanning 2001 to 2020.
9 This approach allows for a detailed examination of individual director experiences within
10 banks, offering a nuanced understanding of the interplay between risk governance
11 characteristics and regulatory adjustments. It includes information such as the country, bank-
12 specific International Securities Identification Number (ISIN), unique director identifier, risk
13 governance characteristics, regulatory adjustments, and the financial data of the banks. The
14 dataset was derived from merging the BankFocus and BoardEx databases, ensuring a robust
15 and reliable source of information for analysis and findings (Van Greuning and Bratanovic,
16 2020).
17
18
19
20
21
22
23
24

25 The research methodology incorporates a three-pronged statistical approach. Firstly,
26 I analyzed descriptive statistics to provide a comprehensive overview of the dataset,
27 presenting fundamental statistical values for each variable. Secondly, correlation analysis was
28 conducted to explore the associations between risk governance characteristics and regulatory
29 adjustments, providing insights into their relationships. Lastly, Principal Component Analysis
30 (PCA) was employed to identify the underlying structure of risk governance characteristics,
31 reducing data dimensionality and aiding in the identification of critical risk governance factors
32 (Quintyn and Chenard, 2004; Chao and Wu, 2017).
33
34
35
36
37
38
39

40 To directly address the research objectives, regression analysis was performed,
41 incorporating fixed effects and accounting for potential confounding factors by including
42 control variables (Stock and Watson, 2008; Streukens and Leroi-Werelds, 2016). This analysis
43 aimed to test the hypothesis that improved or stronger risk governance characteristics are
44 associated with fewer regulatory adjustments in public commercial banks within the OECD
45 (Andres and Vallelado, 2008). Findings from this research indicate a significant negative
46 relationship between risk governance characteristics and regulatory adjustments in public
47 commercial banks within the OECD. Specifically, the presence of a CRO is significantly
48 associated with regulatory adjustments, as indicated by a correlation coefficient of -0.06 at
49 $p < 0.05$. However, the presence of a CFO and SENIOR does not show a significant correlation
50 with regulatory adjustments, emphasizing the importance of efficient risk governance
51 practices (Srivastav and Hagendorff, 2016).
52
53
54
55
56
57
58
59
60

1
2
3 Regulatory oversight is one of the measures for developing, or improving, coherent
4 risk governance policies (Drake et al., 2006). Theoretical frameworks propose that risk
5 governance has a significant impact on supervising risk and managing risks. (Nguyen and
6 Dang, 2022; Caprio and Levine, 2002). Based on the findings, one perspective to consider is
7 that, instead of focusing exclusively on controlling bank risk, shareholders might benefit from
8 exploring the restructuring of risk governance as a means to enhance the effectiveness of risk
9 management (Nguyen and Dang, 2022; Srivastav and Hagendorff, 2016). Based on the
10 findings, one perspective to consider is that, instead of focusing exclusively on controlling
11 bank risk, shareholders might benefit from exploring the restructuring of risk governance as
12 a means to enhance the effectiveness of risk management (Nguyen and Dang, 2022; Quintyn
13 and Chenard, 2004). Additional research could expand upon this study by exploring a broader
14 range of risk governance characteristics and analyzing their influence on regulatory
15 adaptations within the banking sector (Nguyen and Dang, 2022).

16
17
18 In conclusion, this study reveals a significant relationship between specific risk
19 governance characteristics and the frequency of regulatory adjustments in public commercial
20 banks within the OECD. It highlights the importance of roles such as the CRO and CFO, along
21 with the presence of highly qualified directors, in mitigating risks and enhancing risk
22 management practices (Andres and Vallelado, 2008; Srivastav and Hagendorff, 2016).
23 Policymakers, regulators, and bank management can leverage these findings to refine their
24 risk governance strategies and methodologies. By focusing on structured approaches that
25 encompass guidelines, best practices, and effective oversight mechanisms, they can
26 contribute to a more stable and compliant banking sector. Further analysis and robust testing
27 of the research hypotheses will deepen the understanding of the link between risk
28 governance characteristics, regulatory adjustments, and bank stability (Francis and Osborne,
29 2012). Future research, incorporating additional variables and advanced statistical
30 techniques, has the potential to expand upon the current findings and provide more nuanced
31 insights into the dynamics of risk governance in the banking sector (Quintyn and Chenard,
32 2004; Birindelli and Ferretti, 2008;2013).

2. Theory, Literature Review, and Hypothesis Development

Effective risk governance and regulatory compliance are crucial for the stability and reputation of public commercial banks in the OECD (Quintyn and Chenard, 2004; Srivastav and Hagendorff, 2016). This section provides an overview of the theoretical underpinnings and relevant literature on risk governance, regulatory compliance, and their relationship with regulatory adjustments.

Risk governance involves the identification, communication, application, and supervision of risk within banks (Karyani et al., 2020). This research delves deeply into regulatory compliance theory as a key theoretical underpinning. Regulatory compliance theory, which focuses on the adherence of institutions to laws and regulations, is critical in understanding how banks manage and mitigate risk. This theory sheds light on the mechanisms through which banks align their risk governance strategies with regulatory demands, a process that is vital for maintaining stability and credibility in the banking sector.

1
2
3 By exploring how regulatory compliance shapes risk management practices, this study
4 highlights the intricacies of navigating the complex regulatory landscapes that banks operate
5 within. Recent research emphasizes the collective efforts of directors in contributing to risk
6
7 governance. Directors, regardless of their specific roles, add value to risk management by
8
9 incorporating their expertise and perspectives (Erin et al., 2018).
10
11

12 Fiene's (2016) "Theory of Regulatory Compliance" examines why banks follow rules,
13 highlighting factors like culture and stakeholder influence. It posits that compliance goes
14 beyond legal requirements, ensuring financial system stability and integrity. This adherence
15 is crucial for protecting banks and their clients (Birindelli and Ferretti, 2008; Francis and
16 Osborne, 2012). Yao et al. (2023) provide a comparative analysis of the American and Chinese
17 banking systems, offering insights into the impact of different regulatory environments on
18 banking stability and compliance. Compliance with regulatory requirements, such as those
19 related to Common Equity Capital, is vital for maintaining financial stability and protecting
20 stakeholders' interests (Rachdi and Bouheni, 2016; Stolz et al., 2003). Furthermore, the
21 interplay between capital requirements and risk governance forms a crucial aspect of banking
22 stability. This research expands the discussion by exploring how capital requirements, as a
23 key element of regulatory frameworks, influence and are influenced by risk governance
24 practices. For instance, higher capital requirements may prompt banks to adopt more
25 stringent risk governance policies, while effective risk governance can lead to a more efficient
26 capital structure, thus meeting regulatory standards without excessive capital allocation. This
27 bidirectional relationship emphasizes the need for an integrated approach in bank
28 management, where both capital requirements and risk governance are aligned to achieve
29 financial stability. These requirements can be subject to regulatory adjustments, which are
30 changes or modifications made to address evolving financial landscapes or new
31 insights. Penalties imposed by regulators for non-compliance further emphasize the
32 importance of meeting regulatory capital requirements (BCBS; Dodd-Frank Act, 2010; 36/EU
33 Directive, 2013; Ekawati et al., 2021). Recent studies, such as Lubberink and Willett (2023),
34 further illuminate how regulatory capital adjustments impact bank market values, offering a
35 nuanced understanding of the consequences of regulatory non-compliance.
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55

56 The relationship between risk governance characteristics and regulatory adjustments
57 has gained attention in the literature. Strong risk governance practices (Minton et al., 2014;
58 Gontarek and Belghitar, 2018; Lingel and Sheedy, 2012; and Aebi et al., 2012) including the
59
60

1
2
3 presence of a CRO, CFO, and senior directors are expected to be associated with reduced
4 regulatory adjustments. These characteristics, when effectively implemented, enhance risk
5 management practices and improve regulatory compliance, thereby reducing the likelihood
6 of regulatory adjustments (Srivastav and Hagendorff, 2016). Abou-El-Sood and Shahin (2023)
7 extend this understanding by presenting international evidence on the interplay between
8 bank competition, regulatory capital, and risk-taking. To more explicitly connect the reviewed
9 literature with the hypothesis of this study, it is essential to emphasize how the key studies
10 inform and support the hypothesis development. Drawing on the insights from Fiene (2016),
11 Minton et al. (2014), and others, the hypothesis that 'Risk governance characteristics are
12 negatively associated with regulatory adjustments in public commercial banks within the
13 OECD' is based on the understanding that effective risk governance mechanisms, as
14 evidenced in these studies, lead to improved regulatory compliance and stability. This
15 hypothesis is a direct reflection of the theoretical and empirical insights gained from the
16 literature, highlighting the crucial role of risk governance characteristics in shaping regulatory
17 outcomes in banks.

18
19
20
21
22
23
24
25
26
27
28
29
30
31 Based on the above discussions, the following research hypothesis is formulated: "Risk
32 governance characteristics are negatively associated with regulatory adjustments in public
33 commercial banks within the OECD." This hypothesis posits that stronger risk governance
34 practices within banks lead to lower levels of regulatory adjustments. The research aims to
35 empirically test this hypothesis by examining the relationship between risk governance
36 characteristics and regulatory adjustments in public commercial banks within the OECD.

37
38
39
40
41
42 The existing literature offers valuable insights into risk governance, regulatory
43 compliance, and their impact on regulatory adjustments in the banking sector. Studies
44 (Minton et al., 2014; Bageron et al., 2010; Berger et al., 2014; Aebi et al., 2012; Andres and
45 Vallelado, 2008; Caprio and Levine, 2002) highlight the importance of risk governance
46 characteristics, such as the presence of a CRO, CFO, and SENIOR, in reducing regulatory
47 adjustments (Drake et al., 2006; Srivastav and Hagendorff, 2016). These studies emphasize
48 the role of risk governance in enhancing risk management practices and regulatory
49 compliance (Karyani et al., 2020).

50
51
52
53
54
55
56
57
58
59
60 Further research explores the causes of the financial crisis and emphasizes the need
for effective risk governance to prevent such crises (Aebi et al., 2012; Francis and Osborne,
2012). Studies analyze the relationship between corporate governance and firm performance,

1
2
3 highlighting the importance of governance structures in mitigating risks and improving
4 outcomes (Ekawati et al., 2021). Additionally, investigations are conducted to explore the
5 relationship between risk governance and bank stability, providing evidence of the positive
6 impact of strong risk governance practices on bank performance and stability (Erin et al.,
7 2018). In addition, Abdel-Wanis (2021) investigates how regulatory capital and bank
8 characteristics affect risk-taking, offering valuable insights into the regulatory dynamics
9 within the banking sector.

10
11 The Basel Committee on Banking Supervision (BCBS) outlines the Basel III framework,
12 which emphasizes the importance of risk governance and regulatory compliance in ensuring
13 the stability of banks and banking systems (Francis and Osborne, 2012). Gropp et al. (2021)
14 further examine the influence of supranational rules, such as Basel III, on national banking
15 systems, highlighting the complexity of implementing international standards. Studies
16 examine the compliance with international accounting standards, emphasizing the role of
17 institutional factors in shaping compliance behavior (Stolz et al., 2003). The regulation of the
18 shadow banking system is investigated, highlighting the importance of effective regulatory
19 frameworks to address systemic risks (Quintyn and Chenard, 2004).

20
21 Explorations into the relationship between bank governance, regulation, and risk-
22 taking provide evidence of the impact of governance structures on bank behavior (Srivastav
23 and Hagendorff, 2016). Studies analyze the relationship between imperfect competition, risk-
24 taking, and regulation in banking, shedding light on the complex interplay between market
25 structure, risk governance, and regulatory oversight (Drake et al., 2006).

26
27 Additional perspectives include frameworks for managing risks, critically examining
28 regulatory measures and their implications for corporate governance and providing a survey
29 of corporate governance mechanisms and their impact on firm performance (Ekawati et al.,
30 2021). Discussions also cover risk governance, democratic participation, and accountability in
31 the European banking union, exploring the historical perspective of corporate governance
32 and finance in colonial America, and examining the use of market information in prudential
33 bank supervision (Karyani et al., 2020).

34
35 In summary, the literature highlights the significance of risk governance
36 characteristics, such as the presence of specific roles and advanced degrees, in reducing
37 regulatory adjustments and enhancing risk management practices (Erin et al., 2018). It also
38 acknowledges the importance of regulatory compliance in ensuring financial stability and
39

1
2
3 protecting stakeholders' interests (Francis and Osborne, 2012). Effective risk governance
4 practices play a crucial role in facilitating regulatory compliance and contributing to the
5 overall stability and performance of banks (Quintyn and Chenard, 2004).
6
7

8
9 The next section will discuss the research methodology, including the data collection
10 process, statistical analyses, and regression modeling techniques employed to test the
11 hypothesis and examine the relationship between risk governance characteristics and
12 regulatory adjustments.
13
14

15
16 This section has provided a comprehensive theoretical framework and literature
17 review focusing on risk governance, regulatory compliance, and their relationship with
18 regulatory adjustments in public commercial banks within the OECD. The research hypothesis
19 states that risk governance characteristics are negatively associated with regulatory
20 adjustments, aligning with previous research emphasizing the importance of risk governance
21 in reducing regulatory adjustments (Srivastav and Hagendorff, 2016). The literature review
22 highlights the significance of risk governance and regulatory compliance in maintaining
23 financial stability and minimizing the need for regulatory adjustments (Stolz et al., 2003).
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

3. Research Design

3.1. Data collection and description

The dataset for this study provides a comprehensive overview of banks and their directors from 2001 to 2020. It encompasses 14,596 instances, each representing the presence of a specific director in a particular bank for a given year. For instance, if Director A was present in Bank X for three consecutive years, it would be recorded as three separate instances. Over the study period, the dataset captures information from 1,125 unique banks. Additionally, there are 14,404 individual records detailing the presence of directors, reflecting their association with various banks across different years.

It consists of 17 variables related to banks, their directors, and financial information. The dataset includes information on the country, bank-specific ISIN, and a unique identifier for each director. The dependent variable, ~~Regulatory Adjustments (RA)~~, as defined by the Bank for International Settlement (BIS) in CAP30, ~~encompasses adjustments made to a bank's Common Equity Tier 1 to is essential for~~ transparently ~~represent its representing a bank's~~ financial position, including items like intangible assets and deferred tax assets. ~~This focus allows for a deeper understanding of RA's role in providing a clearer view of a bank's core capital is underlined by its importance in financial stability assessments, as discussed in the impact of risk governance on regulatory compliance.~~ context of the Basel Committee ~~guidelines~~. The independent variable, RGI (Risk Governance Index), is an ~~aggregate measure capturing various aggregated~~ measure derived from a Principal Component Analysis (PCA) of ~~risk governance elements~~. The presence of a Risk Committee (RC) is included based on the ~~findings of Gontarek and Belghitar (2018) and McNulty et al. (2013), who emphasize its impact on risk-taking and~~ governance characteristics, such as the presence of a risk committee (RC), ~~a effectiveness~~. The roles of Chief Risk ~~Officer~~Officers (CRO), ~~a~~ and Chief Financial ~~Officer~~Officers (CFO), ~~a director's academic qualifications~~ are included following the insights from Mongiardino and Plath (2010), and Brancato et al. (2006), who discuss the significance of these positions in enhancing risk governance. The inclusion of PhD holders (TITLE), ~~a~~ as a variable is supported by the study of Berger et al. (2014), highlighting their influence on risk management. The factor of senior directors are in the senior age bracket (SENIOR), ~~and~~ is

1
2
3 incorporated following the findings of Agarwal et al. (2009) and Berger et al. (2014), who note
4 the relationship between director age and risk-taking behaviors. Lastly, the variable of
5 independent directors (BI) is based on the works of Adams and Ferreira (2009), Aebi et al.
6 (2012), and Erkens et al. (2012), which link board independence (BI). These elements provide
7 a comprehensive view of a bank's risk governance structure. Additionally, control to improved
8 governance and performance. Control variables like ~~the~~ CEO's additional position (CEOAD),
9 the total number of directors (BS), ~~the bank's~~ bank size (SIZE), and ~~a normalized measure for~~
10 ~~size~~ its logarithm (LNSIZE) ~~have been incorporated.~~ are included due to their recognized impact
11 on corporate governance and risk management, as suggested by Srivastav and Hagedorff
12 (2016). Each variable is meticulously chosen based on its relevance to the study's objectives
13 and its established significance in risk governance and regulatory compliance literature. The
14 financial information was collected from the BankFocus database, while the directors'
15 information was obtained from the BoardEx database.

16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
Frequencies from the dataset reveal that 81 banks have a RC, 15 banks have a CRO, 54 banks have a CFO, 91 banks have directors with a TITLE, 117 directors are in the senior age bracket (SENIOR), and 118 banks have Board Independence (BI). These frequencies provide a detailed insight into the distribution and prevalence of risk governance characteristics in the sampled banks.

61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
The dataset for this study was curated by including banks that are currently operational (active) and publicly traded (listed). The focus was on banks with C1 financial statements, which present a consolidated view of a bank's financial activities by integrating the statements of its controlled subsidiaries or branches. Additionally, C* Additional Consolidated statements, which offer supplementary financial details, were also considered. To compile this dataset, data from the BankFocus database, which provides detailed financial data for banks, was merged with the BoardEx database, which offers insights into board members and senior executives. Only observations that were consistent across both databases were retained to ensure the dataset's accuracy and relevance.

101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1040
1041
1042
1043
1044
1045
1046
1047
1048
1049
1050
1051
1052
1053
1054
1055
1056
1057
1058
1059
1060
1061
1062
1063
1064
1065
1066
1067
1068
1069
1070
1071
1072
1073
1074
1075
1076
1077
1078
1079
1080
1081
1082
1083
1084
1085
1086
1087
1088
1089
1090
1091
1092
1093
1094
1095
1096
1097
1098
1099
1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113
1114
1115
1116
1117
1118
1119
1120
1121
1122
1123
1124
1125
1126
1127
1128
1129
1130
1131
1132
1133
1134
1135
1136
1137
1138
1139
1140
1141
1142
1143
1144
1145
1146
1147
1148
1149
1150
1151
1152
1153
1154
1155
1156
1157
1158
1159
1160
1161
1162
1163
1164
1165
1166
1167
1168
1169
1170
1171
1172
1173
1174
1175
1176
1177
1178
1179
1180
1181
1182
1183
1184
1185
1186
1187
1188
1189
1190
1191
1192
1193
1194
1195
1196
1197
1198
1199
1200
1201
1202
1203
1204
1205
1206
1207
1208
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1230
1231
1232
1233
1234
1235
1236
1237
1238
1239
1240
1241
1242
1243
1244
1245
1246
1247
1248
1249
1250
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
1269
1270
1271
1272
1273
1274
1275
1276
1277
1278
1279
1280
1281
1282
1283
1284
1285
1286
1287
1288
1289
1290
1291
1292
1293
1294
1295
1296
1297
1298
1299
1300
1301
1302
1303
1304
1305
1306
1307
1308
1309
1310
1311
1312
1313
1314
1315
1316
1317
1318
1319
1320
1321
1322
1323
1324
1325
1326
1327
1328
1329
1330
1331
1332
1333
1334
1335
1336
1337
1338
1339
1340
1341
1342
1343
1344
1345
1346
1347
1348
1349
1350
1351
1352
1353
1354
1355
1356
1357
1358
1359
1360
1361
1362
1363
1364
1365
1366
1367
1368
1369
1370
1371
1372
1373
1374
1375
1376
1377
1378
1379
1380
1381
1382
1383
1384
1385
1386
1387
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
1399
1400
1401
1402
1403
1404
1405
1406
1407
1408
1409
1410
1411
1412
1413
1414
1415
1416
1417
1418
1419
1420
1421
1422
1423
1424
1425
1426
1427
1428
1429
1430
1431
1432
1433
1434
1435
1436
1437
1438
1439
1440
1441
1442
1443
1444
1445
1446
1447
1448
1449
1450
1451
1452
1453
1454
1455
1456
1457
1458
1459
1460
1461
1462
1463
1464
1465
1466
1467
1468
1469
1470
1471
1472
1473
1474
1475
1476
1477
1478
1479
1480
1481
1482
1483
1484
1485
1486
1487
1488
1489
1490
1491
1492
1493
1494
1495
1496
1497
1498
1499
1500
1501
1502
1503
1504
1505
1506
1507
1508
1509
1510
1511
1512
1513
1514
1515
1516
1517
1518
1519
1520
1521
1522
1523
1524
1525
1526
1527
1528
1529
1530
1531
1532
1533
1534
1535
1536
1537
1538
1539
1540
1541
1542
1543
1544
1545
1546
1547
1548
1549
1550
1551
1552
1553
1554
1555
1556
1557
1558
1559
1560
1561
1562
1563
1564
1565
1566
1567
1568
1569
1570
1571
1572
1573
1574
1575
1576
1577
1578
1579
1580
1581
1582
1583
1584
1585
1586
1587
1588
1589
1590
1591
1592
1593
1594
1595
1596
1597
1598
1599
1600
1601
1602
1603
1604
1605
1606
1607
1608
1609
1610
1611
1612
1613
1614
1615
1616
1617
1618
1619
1620
1621
1622
1623
1624
1625
1626
1627
1628
1629
1630
1631
1632
1633
1634
1635
1636
1637
1638
1639
1640
1641
1642
1643
1644
1645
1646
1647
1648
1649
1650
1651
1652
1653
1654
1655
1656
1657
1658
1659
1660
1661
1662
1663
1664
1665
1666
1667
1668
1669
1670
1671
1672
1673
1674
1675
1676
1677
1678
1679
1680
1681
1682
1683
1684
1685
1686
1687
1688
1689
1690
1691
1692
1693
1694
1695
1696
1697
1698
1699
1700
1701
1702
1703
1704
1705
1706
1707
1708
1709
1710
1711
1712
1713
1714
1715
1716
1717
1718
1719
1720
1721
1722
1723
1724
1725
1726
1727
1728
1729
1730
1731
1732
1733
1734
1735
1736
1737
1738
1739
1740
1741
1742
1743
1744
1745
1746
1747
1748
1749
1750
1751
1752
1753
1754
1755
1756
1757
1758
1759
1760
1761
1762
1763
1764
1765
1766
1767
1768
1769
1770
1771
1772
1773
1774
1775
1776
1777
1778
1779
1780
1781
1782
1783
1784
1785
1786
1787
1788
1789
1790
1791
1792
1793
1794
1795
1796
1797
1798
1799
1800
1801
1802
1803
1804
1805
1806
1807
1808
1809
1810
1811
1812
1813
1814
1815
1816
1817
1818
1819
1820
1821
1822
1823
1824
1825
1826
1827
1828
1829
1830
1831
1832
1833
1834
1835
1836
1837
1838
1839
1840
1841
1842
1843
1844
1845
1846
1847
1848
1849
1850
1851
1852
1853
1854
1855
1856
1857
1858
1859
1860
1861
1862
1863
1864
1865
1866
1867
1868
1869
1870
1871
1872
1873
1874
1875
1876
1877
1878
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
2049
2050
2051
2052
2053
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065
2066
2067
2068
2069
2070
2071
2072
2073
2074
2075
2076
2077
2078
2079
2080
2081
2082
2083
2084
2085
2086
2087
2088
2089
2090
2091
2092
2093
2094
2095
2096
2097
2098
2099
2100
2101
2102
2103
2104
2105
2106
2107
2108
2109
2110
2111
2112
2113
2114
2115
2116
2117
2118
2119
2120
2121
2122
2123
2124
2125
2126

1
2
3 context would not align with the research objectives and could potentially diminish the depth
4 of the analysis.
5

6
7 In the selection of variables for this study, each was chosen based on its relevance to
8 assessing the impact of risk governance on regulatory adjustments. The primary variable, RA
9 , directly reflects the regulatory changes impacting banks, critical for evaluating governance
10 effectiveness. RGI aggregates key governance features, providing a holistic measure of
11 governance structure. Control variables such as CEOAD, BS, SIZE, and LNSIZE were included
12 to account for factors that might influence or confound the relationship between risk
13 governance and regulatory adjustments. For instance, CEOAD offers insights into leadership
14 concentration, which can affect decision-making processes, while SIZE and LNSIZE help
15 account for the scale of the bank's operations, which can influence governance dynamics and
16 regulatory interactions. This careful selection of variables ensures a comprehensive analysis
17 that aligns with the study's objectives and provides a robust examination of the relationship
18 between governance and regulatory compliance.
19
20
21
22
23
24
25
26
27
28
29
30
31

32 3.2. *Research Methodology*

33
34
35
36 Building on the detailed data description provided earlier, this section delves into the
37 methodological approach adopted for this research. The study leverages a comprehensive
38 dataset to empirically investigate the relationship between risk governance characteristics
39 and regulatory adjustments. Various statistical techniques and models are employed to
40 ensure robustness in the findings and to account for potential confounding factors. The
41 subsequent sections will detail the specific models used, the rationale behind their selection,
42 and the results derived from them.
43
44
45
46
47
48

49 The selection of variables from the database was driven by the need to evaluate risk
50 governance factors. This includes aspects such as the number of board members, their
51 presence on the board, and their professional qualifications, among other relevant factors.
52 Acknowledging the concerns about the relevance of public profiles of board members for risk
53 governance characteristics, it was clarified that the choice of BoardEx was dictated by the
54 availability of this information.
55
56
57
58
59
60

1
2
3 Variables of interest were standardized to reconcile differences in scale and ensure
4 comparability. A PCA was then conducted on these standardized variables with an aim to
5 identify the principal components that would explain the greatest variance in the data.
6
7

8
9 Subsequently, the data was transitioned into a panel setup, arranged based on unique
10 combinations of bank and director identifiers and the corresponding year. The research
11 employed a fixed-effects modeling approach, aligning closely with the theoretical
12 underpinnings of the study, especially given the span across OECD countries and over a 20-
13 year period. Additionally, the fixed-effects model is particularly advantageous in mitigating
14 potential endogeneity issues arising from unobserved heterogeneity. By controlling for both
15 bank-specific and time-specific effects, the model accounts for the possibility that unobserved
16 factors, which could be correlated with both the independent and dependent variables, might
17 bias the results. This approach effectively isolates the impact of risk governance
18 characteristics on regulatory adjustments, providing more reliable and accurate estimates of
19 their relationships. The model was estimated using the "xtreg" command in Stata, which is
20 specifically designed for panel data regressions, allowing for the estimation of both fixed-
21 effects and random-effects models.
22
23

24
25 An econometric model was designed to encapsulate the regulatory adjustments
26 occurring in different countries.
27
28

29
30
31
32
33
34
35
36
37
38 *Model 1: $RA_{bt} = \beta_0 + \beta_1 * RGI_{bt} + \beta_2 * CEOAD_{bt} + \beta_3 * BS_{bt} + \beta_4 * SIZE_{bt} + \alpha_b + \delta_t + \varepsilon_{bt}$*
39
40
41

42
43 In this research, a primary focus is placed on the dependent variable, RA (Regulatory
44 Adjustments). Regulatory adjustments, as defined by the Bank for International Settlement
45 (BIS) in CAP30, are crucial for banks. They encompass various elements such as intangible
46 assets, deferred tax assets, cash flow hedge reserve, and cumulative gains and losses due to
47 changes in own credit risk on fair valued liabilities. Primarily applied to Common Equity Tier
48 1, these adjustments aim to provide a transparent view of the Common Equity Tier 1 to all
49 stakeholders. Institutions are mandated to apply these requirements to all their assets
50 measured at fair value when calculating their own funds. Furthermore, any additional value
51 adjustments deemed necessary are deducted from the Common Equity Tier 1 capital. The
52 model, therefore, examines the relationship between RA and the independent variables,
53 including the Risk Governance Index (RGI), which has been renamed from Comp1 following a
54
55
56
57
58
59
60

1
2
3 PCA, CEOAD, BS, and SIZE. In the model, RA_{bt} , RA_{bt} represents the Regulatory Adjustment for
4 bank b in year t . Here, b denotes the bank and t represents time in years. The model controls
5 for bank and time fixed effects denoted by α_b and δ_t , respectively for unobserved
6 heterogeneity across banks and time. The error term, ε_{bt} , represents the unobserved factors
7 influencing the dependent variable. Clustered standard errors at the bank level are employed
8 to account for potential correlation within banks. These adjustments mirror the diverse
9 national regulatory environments, economic conditions, and governance structures.
10 Distinctions were made between regulatory adjustments as changes mandated by regulators,
11 and governance and controls as the bank's internal mechanisms. The 'beta', or the slope
12 intercept, is the baseline level of Regulatory Adjustment in the absence of other control
13 variables.

14
15
16
17
18
19
20
21
22
23 The main regression analysis utilized the `reghdfe` command. This command is an
24 extension of Stata's standard regression command, specifically tailored for high-dimensional
25 fixed effects models. It efficiently estimates linear regressions with multiple levels of fixed
26 effects by absorbing these effects. In this research, the `reghdfe` command was employed to
27 estimate the fixed effects model, absorbing both year and bank fixed effects. Additionally,
28 standard errors were clustered at the bank level to account for potential correlations within
29 banks and to provide robust standard errors. To assess the robustness of the main regression
30 analysis, a bootstrap procedure with 100 repetitions was conducted (Karyani et al., 2020). To
31 assess the robustness of Model 1, a bootstrap technique is employed with 100 replications to
32 assess the robustness of the results from Model 1 in Model 1a. The bootstrap resampling
33 method generates multiple replicated datasets by sampling with replacement from the
34 original dataset. This approach allows for the estimation of coefficients' stability and provides
35 robust standard errors. The estimated coefficients and their significance levels are evaluated
36 using the bootstrap results.

37
38
39
40
41
42
43
44
45
46
47
48
49 A sensitivity analysis was conducted using alternative dependent variables, "TIER1"
50 (Tier 1 capital / Risk Weighted assets) and "TCR" (Total capital / Risk Weighted assets), to test
51 the robustness of the results obtained with the primary dependent variable, RA (Regulatory
52 Adjustments). Both TIER1 and TCR are critical indicators of a bank's financial health and
53 stability. Given that regulatory adjustments primarily influence Common Equity Tier 1, which
54 is a component of TIER1, there's an inherent relationship between these variables. By
55 examining the results across RA, TIER1, and TCR, the analysis aims to ascertain the consistency
56
57
58
59
60

and robustness of the findings. The models were estimated with fixed effects, clustering the standard errors at the bank level, and employing a bootstrap with 100 repetitions to further assess robustness.

Sensitivity models:

$$\text{Model 2: } TIER1_{bt} = \gamma_0 + \gamma_1 * RGI_{bt} + \gamma_2 * CEOAD_{bt} + \gamma_3 * BS_{bt} + \gamma_4 * SIZE_{bt} + \alpha_b + \gamma_t + \epsilon_{bt}$$

$$\text{Model 3: } TCR_{bt} = \delta_0 + \delta_1 * RGI_{bt} + \delta_2 * CEOAD_{bt} + \delta_3 * BS_{bt} + \delta_4 * SIZE_{bt} + \alpha_b + \gamma_t + \epsilon_{bt}$$

In Model 2, $TIER1_{bt}$ represents the dependent variable, for bank b in time period t . The independent variables are RGI, CEOAD, BS, and SIZE for the corresponding bank and time period. The fixed effects, α_b and γ_t capture bank and time heterogeneity, respectively, while the error term, ϵ_{bt} , accounts for unobserved factors influencing the TIER1.

To assess the robustness of Model 2, a bootstrap technique is employed in Model 2a same as in Model 1. Similarly, in Model 3, TCR_{bt} represents the dependent variable, TCR for bank b in time period t . The independent variables and other definitions of fixed effects and error term are same as in Model 1 and 2 along with the application of bootstrap technique for robustness of Model 3 in Model 3a.

In conclusion, the methodology, underpinned by data on OECD banks spanning 20 years, seeks to elucidate the relationship between regulatory adjustments and risk governance. While the paper does not directly study variations across national contexts or provide a baseline understanding in the absence of governance and control variables, the comprehensive dataset inherently captures the nuances and variations over time and across different banking environments. This approach offers valuable insights into the dynamics of regulatory adjustments in relation to risk governance.

[Insert Table I here]

4. Results

4.1. *Descriptive Statistics*

This section presents a detailed overview of the descriptive statistics for key variables in the dataset. The dataset encompasses 14,596 bank-director years from 2001 to 2020, providing a comprehensive view of the banking landscape within this period.

Each variable is selected for its relevance to the study's focus on regulatory compliance and risk governance. The RA variable, with a mean value of 548,608 € and a standard deviation of 4,100,070 €, is central to understanding the scope and frequency of adjustments made by banks in response to regulatory changes. TIER1 and TCR offer insights into banks' capital adequacy, while variables like RC, CRO, CFO, TITLE, SENIOR, and BI provide a nuanced view of the composition and characteristics of bank boards. This section not only presents these statistics but also contextualizes them within the broader framework of

regulatory compliance and risk governance, crucial for accurately interpreting the data and understanding its larger research implications.

Table 2 presents the descriptive statistics for the variables in the dataset. The variable RA, with a mean value of 548,607.9 and a standard deviation of 4,100,070. The variable TIER1, with a mean value of 13.24027 and a standard deviation of 3.202067. The variable TCR, with a mean value of 15.23164 and a standard deviation of 3.44537. Other variables such as RC, CRO, CFO, SENIOR, and BI are also included in the table. These descriptive statistics provide an overview of the distribution and variation of the variables in the dataset. The descriptive statistics in this study, particularly in relation to RA, TIER1, and TCR, resonate with trends observed in the seminal work of Francis and Osborne (2012). Their investigation into the impact of capital requirements on bank behavior provides essential context for understanding how regulatory frameworks influence banking operations. The variable RA, characterized by a significant mean and standard deviation, indicates substantial variability in banks' responses to regulatory changes. This aspect of the findings can be contrasted with the research by Francis and Osborne (2012), who explored the impact of capital requirements on bank behavior. While their study provides a broad overview of the regulatory impacts, the current analysis extends these insights by highlighting specific variances in key variables, thereby contributing to a more nuanced understanding of banks' behaviors under different regulatory environments. This study extends these insights by showcasing the specific variances in key variables within the dataset, thereby contributing to a more nuanced understanding of bank behaviors under different regulatory environments.

[insert table II here]

4.2. Correlation

In this section, the correlation matrix is used to explore the relationships between different variables, particularly focusing on risk governance characteristics and their influence on regulatory adjustments. This matrix is a crucial statistical tool that helps in understanding how variables are interrelated within the dataset. The correlations provide insights into potential associations but do not imply causation. For instance, a negative correlation between RA and

1
2
3 TIER1 suggests an inverse relationship, but it's important to consider other factors that might
4 be influencing these variables.
5

6
7 To address concerns about multicollinearity, which arises when independent variables
8 in a regression model are highly correlated, this study has conducted careful variable selection
9 and analysis. While some degree of correlation is expected due to the nature of the variables
10 studied, the impact on the regression models is mitigated through the use of advanced
11 statistical techniques and the interpretation of results in the context of existing literature.
12 This approach helps ensure that the findings are robust and reliable.
13
14
15
16
17

18 The correlation matrix presents the relationships among the variables in the study,
19 focusing on risk governance characteristics and their association with regulatory adjustments.
20 Among these characteristics, only the CRO shows a small negative correlation with regulatory
21 adjustments, while the CFO and TITLE do not exhibit significant negative correlations with
22 regulatory adjustments. Conversely, the presence of a RC shows a positive correlation, and BI
23 exhibits a significant positive correlation with RA. These findings suggest that while certain
24 risk governance characteristics may influence regulatory adjustments, their impact varies. The
25 observed correlations in this study, particularly those related to risk governance
26 characteristics such as the presence of a CRO and their impact on regulatory adjustments,
27 offer noteworthy insights. These findings are in line with the research conducted by Erin et al.
28 (2018) on the Nigerian banking sector, which also underscored the influence of risk
29 governance on bank performance. Furthermore, the relationship between risk governance
30 characteristics and regulatory adjustments resonates with the findings of Srivastav and
31 Hagendorff (2016), who emphasized the significance of these factors in the banking sector.
32 The current analysis enriches this discourse by providing empirical evidence from the OECD
33 public commercial banks, thereby contributing to a more comprehensive understanding of
34 risk governance within diverse regulatory contexts. This study's findings, particularly the
35 correlation between risk governance characteristics and regulatory adjustments, align with
36 Erin et al. (2018). Their research on the Nigerian banking sector similarly highlighted the
37 influence of risk governance on bank performance, underscoring the relevance of these
38 correlations in understanding bank behavior within regulatory frameworks. The correlation
39 matrix provides clear evidence of specific relationships between risk governance
40 characteristics and regulatory adjustments, underscoring the need for careful interpretation
41 and consideration of broader research implications, as discussed in Srivastav and Hagendorff
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

(2016). Further analysis is needed to assess the statistical significance and strength of these associations.

[insert table III here]

4.3. *Principal Component Analysis*

Building on the foundational understanding of risk governance practices highlighted in the previous work such as Karyani et al. (2020), this study conducts a PCA to explore the underlying structure and dimensionality of specific risk governance characteristics. The variables of interest, namely RC, CRO, CFO, TITLE, SENIOR, and BI, were included in the analysis to further investigate their interrelationships and potential impact on regulatory adjustments. The PCA analysis identified six principal components based on the variance in the dataset. The first component, labeled as Comp1, captured the most variance with an eigenvalue of 1.33838. Comp1 explained 22.31% of the total variance, indicating its significance in capturing the variability in the risk governance characteristics. The subsequent components, Comp2 to Comp6, accounted for decreasing proportions of the variance.

The loadings of the variables on the principal components provide insights into their contribution to the overall structure. Comp1 has a negative loading for CRO, CFO, and SENIOR. Specifically, SENIOR has a pronounced negative loading of -0.4137 on Comp1, suggesting a significant inverse relationship. CRO also has a negative relationship with Comp1, indicated by its loading of -0.2171. However, CFO's contribution to Comp1 is minimal, as evidenced by its loading of -0.0288. This makes Comp1 a suitable representative of the risk governance characteristics in the subsequent regression analysis. The PCA findings in this study, particularly regarding the significant variance captured by Comp1 and its loadings on CRO, CFO, and SENIOR, align with the methodologies employed by Karyani et al. (2020) in their study on the ASEAN-5 banking sector. They also utilized PCA to dissect risk governance characteristics, finding key components that influence bank operations. The similarity in the use of PCA and the identification of influential risk governance factors in both studies not only validates the methodology but also reinforces the importance of these characteristics in risk governance analysis within the banking sector.

Including Comp1 as an explanatory variable in the regression analysis facilitates the examination of its relationship with RA, offering insights into the potential association

1
2
3 between risk governance characteristics and regulatory adjustments (Drake et al., 2006). By
4 utilizing Comp1, which emerged from the PCA as a comprehensive measure of risk
5 governance characteristics, the study can effectively capture the collective impact of CRO,
6 CFO, and SENIOR on regulatory adjustments. This approach, grounded in the PCA findings,
7 enhances the interpretability and efficiency of the regression model. It provides a nuanced
8 evaluation of the role played by risk governance characteristics in potentially influencing
9 regulatory adjustments, aligning with the broader research context highlighted by Srivastav
10 and Hagendorff (2016).
11
12
13
14
15
16
17

18 The PCA ~~approach and its findings methodology~~ in this study ~~echo not only aligns with~~
19 ~~the methodologies and results seen in approach taken by~~ Karyani et al. (2020). ~~Their work in~~
20 ~~the ASEAN-5 banking sector) but~~ also ~~utilized PCA to unravel the intricacies extends it by~~
21 ~~offering unique insights into the role of senior directors in~~ risk governance, ~~providing a~~
22 ~~foundation. While Karyani et al. (2020) laid the groundwork~~ for understanding ~~the~~
23 ~~multifaceted nature of these characteristics. The parallels in PCA application and the~~
24 ~~emergence of key risk governance in the ASEAN-5 banking sector, this study further explores~~
25 ~~how specific~~ components like senior director roles ~~in both studies underscore the validity and~~
26 ~~importance of these methods in dissecting the complex uniquely contribute to the~~ dynamics
27 of risk governance in ~~OECD public commercial banks. This distinction highlights the study's~~
28 ~~contribution to the broader discourse on risk governance, enhancing the understanding of its~~
29 ~~multifaceted nature in different banking sector contexts.~~
30
31
32
33
34
35
36
37
38
39
40
41

42 [insert tables IV-a, IV-b, and IV-c here]
43
44

45 4.4. Main Regression Analysis 46 47 48

49 The main regression analysis results provide important insights into the relationship
50 between the Risk Governance Index (RGI), represented by Comp1, and regulatory
51 adjustments. The regression model incorporated the RGI, capturing the collective influence
52 of risk governance characteristics, along with control variables such as CEOAD, BS, and SIZE.
53 The coefficient for RGI was statistically significant and negative (-18,760.77, $p < 0.05$),
54 indicating that a higher score on RGI, reflecting stronger risk governance practices associated
55 with CRO, CFO, and SENIOR, is linked to lower levels of regulatory adjustments. This
56
57
58
59
60

1
2
3 association remains robust even when controlling for CEOAD, BS, and SIZE, suggesting that
4 risk governance characteristics, as represented by RGI, are associated with lower levels of
5 regulatory adjustments, even after accounting for other control variables (Srivastav and
6 Hagendorff, 2016). The negative relationship between the RGI and regulatory adjustments,
7 as indicated by the significant coefficient in the regression analysis, resonates with the
8 findings of Srivastav and Hagendorff (2016). They explored similar dynamics in the context of
9 bank risk-taking behaviors and governance. The alignment of these results with their study
10 provides a broader validation of the hypothesis that stronger risk governance practices,
11 particularly those characterized by CRO, CFO, and SENIOR roles, are instrumental in reducing
12 the need for regulatory adjustments. This study extends these insights by demonstrating how
13 such governance characteristics specifically impact regulatory adjustments in the context of
14 OECD public commercial banks, thereby contributing to the ongoing discourse on effective
15 risk governance and regulatory compliance.

16
17
18
19
20
21
22
23
24
25
26
27 These findings offer empirical evidence supporting the hypothesis that risk
28 governance characteristics, as represented by the RGI, are associated with regulatory
29 adjustments. This study carefully considers the fixed-effects modeling approach to address
30 potential endogeneity. This method controls for unobserved heterogeneity that could bias
31 estimates. Incorporating fixed effects for banks and time, the model accounts for unobserved,
32 bank-specific factors and time-related effects that could influence the dependent variable,
33 enhancing the credibility of the findings. Such methodological consideration ensures the
34 robustness of results and mitigates the risk of endogeneity. The negative coefficient for RGI
35 suggests that strong risk governance practices, particularly those characterized by the
36 presence of a CRO, CFO, and SENIOR, are linked with fewer regulatory adjustments. This
37 association underscores the importance of effective risk governance in aligning financial
38 statements with regulatory standards and potentially reducing the frequency of adjustments
39 required by regulatory bodies like the Bank for International Settlements (BIS). The specific
40 mention of CRO, CFO, and SENIOR is due to their significant loadings in the PCA, indicating
41 their pivotal role in the overall risk governance framework and its impact on regulatory
42 compliance.

43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58 [insert table V here]
59
60

4.5. Sensitivity Analysis

The results of the sensitivity analysis, robust to heteroskedasticity using bootstrap replication, provide additional insights into the relationship between risk governance characteristics and regulatory adjustments. The analysis focused on TIER1 as the dependent variable. The coefficient for RGI remains positive (0.0074) in the sensitivity analysis, but it does not achieve statistical significance at the conventional level ($p < 0.05$). However, the coefficient is marginally significant at a 10% significance level ($p < 0.10$). While the bootstrap results do not strongly confirm the main regression findings, they suggest a consistent positive association between RGI and TIER1. The statistical significance of this association is not firmly established based on the available data, but the consistent direction of the coefficient across the bootstrap replications suggests a tendency towards a positive relationship. These findings indicate an association between risk governance characteristics, as represented by RGI, and the TIER1 for banks. However, it's important to note that this does not imply a direct causal relationship. In the sensitivity analysis, the positive coefficient for Comp1 suggests a potential association between TIER1 and the risk governance characteristics. Specifically, while the RC shows a positive influence on TIER1, the roles of CRO, CFO, and Senior Directors might have inverse effects. However, given the nature of sensitivity analyses, these findings should be interpreted with caution, as they are meant to test the robustness of our main regression results rather than establish definitive relationships. Caution is exercised in interpreting these results, as the statistical significance of the association is not firmly established. Further research with a larger sample size may be necessary to obtain more conclusive evidence on the relationship between risk governance characteristics and the regulatory capital ratio. It's pertinent to note that while this study delves into the relationship between risk governance characteristics and regulatory adjustments, ~~Karyani et al. (2020) investigated the impact of risk governance and market competition on banks' operational risk disclosure quality in the ASEAN-5 banking sector. Their findings underscore the broader significance of risk governance practices in the banking industry and the potential interplay between governance and market factors.~~

The sensitivity analysis, robust to heteroskedasticity using bootstrap replication, provides additional insights into the relationship between risk governance characteristics and the TCR. The coefficient for RGI in the main regression analysis remains statistically significant

1
2
3 and negative (-0.0585, $p < 0.05$) even after accounting for potential variations in the
4 estimation.
5

6
7 The negative association between RGI and TCR suggests that there's a correlation
8 between risk governance characteristics, as captured by RGI, and the overall capital adequacy
9 of banks, as reflected by the total capital ratio. This indicates that while risk governance
10 characteristics may be associated with higher tier 1 capital, which primarily consists of a
11 bank's core capital, they may not necessarily correlate with tier 2 capital, which includes
12 supplementary capital like subordinated debt and loan-loss reserves, or other components of
13 the total capital.
14
15

16
17 The bootstrap results further support the main regression findings, confirming the
18 stability of the negative coefficient for RGI across the bootstrap replications. This consistency
19 strengthens the evidence that risk governance characteristics have a limited influence on the
20 TCR of banks.
21
22

23
24 These findings suggest that risk governance characteristics may play a more significant
25 role in enhancing the core capital component (tier 1 capital) of banks, while their impact on
26 other components, such as tier 2 capital, may be limited. It is essential to consider additional
27 factors that influence the TCR beyond risk governance characteristics, as they may contribute
28 to a more comprehensive understanding of the bank's overall capital structure.
29
30
31

32
33 In the sensitivity analysis, the exploration of the relationship between risk governance
34 characteristics and regulatory capital ratios, as seen through the lens of RGI's impact on TIER1
35 and TCR, offers a nuanced perspective on governance practices. This aligns with and extends
36 the findings of Karyani et al. (2020), who examined the influence of risk governance and
37 market competition on banks' operational risk disclosure quality in the ASEAN-5 banking
38 sector. Their study underscores the broad significance of risk governance in banking and the
39 interplay between governance and market factors, a theme that resonates with the current
40 study's focus on regulatory capital ratios.
41
42
43
44
45
46
47
48
49
50
51

52
53 [insert table VI here]
54
55
56
57
58
59
60

4.6. Discussion

The results of the main regression analysis and sensitivity analysis provide valuable insights into the relationship between risk governance characteristics and regulatory adjustments in public commercial banks within the OECD. The findings suggest that risk governance characteristics, particularly those represented by CRO, CFO, and SENIOR, play a crucial role in mitigating regulatory adjustments and ensuring regulatory compliance. The negative associations observed in the correlation analysis (Section 4.2, Table III) and regression analysis indicate that a stronger presence of these risk governance characteristics is associated with lower levels of regulatory adjustments. This supports the hypothesis that effective risk governance practices contribute to the stability and reputation of public commercial banks within the OECD. While the direct impact on stability and reputation is beyond the scope of this study, it's evident that effective risk governance practices can influence regulatory adjustments in public commercial banks within the OECD. As highlighted by Srivastav and Hagendorff (2016), governance mechanisms play a crucial role in shaping bank risk-taking behaviors, emphasizing the need for internal governance mechanisms that reflect the needs of various stakeholders to ensure financial stability.

These findings are consistent with the earlier discussion emphasizing the significance of risk governance roles, particularly the roles of CRO, CFO, and SENIOR, in influencing regulatory adjustments. This alignment with previous research, such as that by Stolz et al. (2003), further underscores the importance of these roles in enhancing risk management practices within public commercial banks. The results also align with the principles set out in regulatory frameworks that emphasize risk governance and regulatory compliance. Specifically, the Basel III framework, introduced by the Basel Committee on Banking Supervision, focuses on strengthening bank capital requirements and introducing new regulatory requirements on bank liquidity and bank leverage. These measures are designed to enhance the resilience of the banking sector and reduce the risk of systemic failures. While this study does not directly address the concept of "stability," the findings do shed light on the relationship between risk governance characteristics and regulatory adjustments in public commercial banks.

1
2
3 The sensitivity analysis, as presented in Table VI, was conducted to assess how the
4 main results with the RA variable might change if the dependent variable is altered to TIER1
5 or TCR. For the models with TIER1 as the dependent variable, there's a positive association
6 with the RGI variable, indicating that an enhancement in risk governance correlates with an
7 increase in TIER1. However, this association is significant at the 10% level in Model 1.
8 Additionally, the SIZE variable shows a negative relationship with TIER1, significant at the 1%
9 level, suggesting that larger banks might have a lower TIER1. The CEOAD and BS variables do
10 not exhibit statistical significance in these models. It's essential to interpret these findings in
11 the context of the broader research and consider the implications for risk governance
12 practices in public commercial banks within the OECD. Future research, especially studies like
13 that of Ekawati et al. (2021) which delve into the interplay between risk management, capital
14 structure, and corporate governance, can offer deeper insights into the influence of risk
15 governance characteristics on banks' financial performance and capital structure.
16
17

18 While the main regression results, as presented in Table V, indicate a negative
19 association between RGI and RA, the sensitivity analysis for TCR, robust to heteroskedasticity
20 using bootstrap replication, also reveals a negative association between RGI and TCR. This
21 contrast with the positive association observed for TIER1 underscores the nuanced impact of
22 risk governance on different components of banks' capital structure and regulatory
23 adjustments. This suggests that risk governance characteristics, as represented by RGI, may
24 have a differential impact on different components of the bank's capital structure. Further
25 research is necessary to explore the specific reasons behind this negative association and its
26 implications for bank risk management and capital adequacy.
27
28

29 Overall, the results of this study contribute to the existing literature on risk
30 governance, regulatory compliance, and their relationship with regulatory adjustments in
31 public commercial banks within the OECD. The findings highlight the importance of effective
32 risk governance practices in mitigating regulatory adjustments and maintaining financial
33 stability. In line with the insights from Francis and Osborne (2012), who examined the effects
34 of regulatory capital requirements on bank behavior in the UK, policymakers and bank
35 regulators can use these findings to inform their efforts in strengthening risk governance
36 frameworks and promoting regulatory compliance in the banking sector. This is especially
37 pertinent given the ongoing debates surrounding the design and calibration of international
38 capital standards.
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

5. Conclusion

Findings from the analysis support the hypothesis that the presence of specific roles, namely a CRO, CFO, and SENIOR, have a significant negative association with regulatory adjustments. As clarified in section 4.6, along with the overall risk governance characteristics, these three roles in particular stand out as significant based on their loadings in the PCA. This implies that stronger risk governance, represented by these characteristics, can reduce the level of regulatory adjustments in banks. While the study does not directly address financial stability, the observed reduction in regulatory adjustments suggests a more compliant and, by implication, a potentially more stable banking environment. This conclusion provides valuable insights for policymakers and bank regulators, as they can focus their efforts on enhancing these specific risk governance practices to promote regulatory compliance and indirectly contribute to the stability of the banking sector.

However, while the findings are consistent and hold true across various tests and conditions, it is crucial to acknowledge the limitations of the study. The sample size and dataset used in this study might limit the generalizability of the findings. A larger sample size, a more diverse set of data, or focusing on a specific group of banks, might yield different results. It is also important to remember that correlation does not imply causation, and while the study found associations, more research is required to establish causal relationships.

This study enriches the literature on risk governance and regulatory compliance in OECD public commercial banks. It reveals the impact of roles like CRO, CFO, and SENIOR on regulatory adjustments, offering insights for future research and policy-making. While not directly addressing financial stability, the findings suggest effective risk governance may enhance regulatory compliance and indirectly indicate a more stable banking environment.

In terms of future research, it would be valuable to delve deeper into the specific mechanisms through which risk governance characteristics influence different components of a bank's capital structure. This could provide more granular insights into the dynamics of risk governance and its implications for bank performance. The study's conclusions underscore the significance of specific risk governance roles in reducing regulatory adjustments, suggesting a more compliant and potentially stable banking environment. These

1
2
3 insights offer practical implications for policymakers and bank regulators, highlighting the
4 importance of enhancing risk governance practices, particularly focusing on roles like CRO,
5 CFO, and SENIOR, to promote regulatory compliance and indirectly support banking sector
6 stability. The limitations of the study, such as sample size and dataset scope, point towards
7 the need for further research to generalize these findings and establish causal relationships.
8 Future research should explore the mechanisms through which risk governance
9 characteristics influence bank capital structure and performance, as well as the collective
10 impact of various governance elements on regulatory adjustments and stability. This study
11 contributes to the literature on risk governance and regulatory compliance, particularly in
12 OECD public commercial banks, and provides a foundation for future policy-making and
13 research initiatives. By suggesting directions for further investigation, it bridges the gap
14 between theory and practice, offering a path for applying these insights in real-world banking
15 and regulatory scenarios. Additionally, considering other risk governance characteristics not
16 covered in this study could offer a more comprehensive view of the landscape. Exploring the
17 interaction and synergy effects between different risk governance characteristics might also
18 shed light on how these elements collectively impact regulatory adjustments and overall bank
19 stability. We encourage researchers to take these suggestions into account as they continue
20 to expand the knowledge base in this domain.
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

References

- Abdel-Wanis, E. (2021), *"The impact of regulatory capital and bank characteristics on the relationship between bank competition and risk taking in the banking system"*, Journal of Accounting, Business and Management (JABM), Vol. 28(No. 1), pp. 87-100.
- ~~Abou-El-Sood, H., Abou-El-Sood, H. and Shahin, R.~~ *Shahin, R. (2023), "Bank competition, regulatory capital, and risk taking: international evidence. Managerial Finance", Managerial Finance, Vol. 49 No. 10, pp. 1614-1640. <https://doi.org/10.1108/MF-06-2022-0277>*
- Adams, R., and Ferreira, D. (2009), "Women in the boardroom and their impact on governance and performance", Journal of Financial Economics, Vol. 94, pp. 291–309.*
- Aebi, V., Sabato, G. and Schmid, M. (2012), "Risk management, corporate governance, and bank performance in the financial crisis", Journal of Banking and Finance, Vol. 36, pp. 3213–3226.*
- Agarwal, S., and Wang, F.H. (2009), "Perverse incentives at the banks? Evidence from a natural experiment", Working Paper 2009–08. Federal Reserve Bank of Chicago.*

- 1
2
3 Andres, P. de. and Vallelado, E. (2008), "Corporate governance in banking: The role of the
4 board of directors", Journal of Banking and Finance, Vol. 32 No. 12, pp.2570–2580.
5 <https://doi.org/10.1016/j.jbankfin.2008.05.008>
6
7 Barger, L.L. Lehn, K.M. and Zutter, C.J. (2010), "Sarbanes-Oxley and corporate risk-taking",
8 Journal of Accounting and Economics, Vol. 49 No. 1-2, pp. 34-52.
9
10 Basel Committee on Banking Supervision. (2011), "Basel III: A global regulatory framework
11 for more resilient banks and banking systems", Bank for International Settlements.
12
13 BCBS (2015), "Corporate Governance Principles for Banks, Bank for International
14 Settlements", available at: <https://www.bis.org/bcbs/publ/d328.pdf> (accessed 21
15 June 2023).
16
17 Berger, A. N., Kick, T., and Schaeck, K. (2014), "Executive board composition and bank risk
18 taking", Journal of Corporate Finance, Vol. 28, pp. 48-65.
19
20 Birindelli, G. and Ferretti, P. (2013), "Compliance function in Italian banks: organizational
21 issues", Journal of Financial Regulation and Compliance, Vol. 21 No. 3, pp. 217–240.
22
23 Birindelli, G. and Ferretti, P. (2008), "Compliance risk in Italian banks: the results of a survey",
24 Journal of Financial Regulation and Compliance, Vol. 16 No. 4, pp. 335–351.
25
26 BIS (2019), "CAP30, Regulatory Adjustments", available at:
27 https://www.bis.org/basel_framework/chapter/CAP/30.htm
28
29 [Brancato, C., Tonello, M., Hexter, E., and Newman, K. R. \(2006\), "The role of US corporate
30 boards in enterprise risk management", The Conference Board Research Report, No.
31 R-1390-06-RR.](#)
32
33 Caprio, G. and Levine, R. (2002), "Corporate governance in finance: Concepts and
34 international observations", in Financial Sector Governance: The Roles of the Public
35 and Private Sectors, pp.17-50.
36
37 Chao, Y.-S. and Wu, C.-J. (2017), "Principal component-based weighted indices and a
38 framework to evaluate indices: Results from the Medical Expenditure Panel Survey
39 1996 to 2011", PLoS One, Vol. 12 No. 9, e0183997–e0183997.
40
41 DIRECTIVE 2013/36/EU of the European Parliament and of the Council of 26 June 2013,
42 available at: [https://eur-lex.europa.eu/legal-](https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32013L0036)
43 [content/EN/ALL/?uri=CELEX:32013L0036](https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32013L0036) (accessed 21 June 2023).
44
45 Dodd-Frank Wall Street Reform and Consumer Protection Act, Public Law 203, U.S. Statutes
46 at Large 124 (2010): pp. 1376-2223.
47
48 Drake, L., Hall, M.J. and Simper, R. (2006), "The impact of macroeconomic and regulatory
49 factors on bank efficiency: A non-parametric analysis of Hong Kong's banking
50 system", Journal of Banking and Finance, Vol. 30 No. 5, pp.1443-1466.
51
52 Ekawati, N., Purwohedi, U. and Warokka, A. (2021), "The Influence of Risk Management,
53 Third-Party Funds and Capital Structure on Banking Sector Financial Performance in
54 Indonesia and Thailand with Corporate Governance as Moderating Variable in 2015-
55 2019", Oblik i Finansi, No. 94, pp.71-80.
56
57
58
59
60

- 1
2
3 Erin, O., Asiriwa, O., Olojede, P., Ajetunmobi, O. and Usman, T. (2018), "Does risk
4 *governance impact bank performance? Evidence from the Nigerian banking sector*",
5 Academy of Accounting and Financial Studies Journal, Vol. 22 No. 4, pp.1-14.
- 6 Erkens, D. H., Hung, M., and Matos, P. (2012), "Corporate governance in the 2007–2008
7 financial crisis: Evidence from financial institutions worldwide", Journal of Corporate
8 Finance, Vol. 18, pp. 389–411.
- 9
10
11 Fiene, R. (2016), "A Treatise on the Theory of Regulatory Compliance", Journal of Regulatory
12 Science, Vol. 7 No. 1-3.
- 13
14 Francis, B. B., and Osborne, M. (2012), "Capital requirements and bank behavior in the UK:
15 *Are there lessons for international capital standards?*", Journal of Banking and
16 Finance, Vol. 36 No. 3, pp. 803-816.
- 17
18 Gontarek, W., and Belghitar, Y. (2018), "Risk governance: Examining its impact upon bank
19 *performance and risk-taking*", Financial Markets, Institutions and Instruments, Vol.
20 27 No. 5, pp. 187-224.
- 21
22
23 Gropp, R., Mosk, T., Ongena, S., Simac, I., and Wix, C. (2021), "Supranational rules,
24 *national discretion: Increasing versus inflating regulatory bank capital*", Journal of
25 Financial and Quantitative Analysis, pp. 1-58.
- 26
27 Karyani, E., Kolade, O. and Dewo, S.A. (2020), "Risk governance, market competition and
28 *operational risk disclosure quality: a study of the ASEAN-5 banking sector*", Journal of
29 Operational Risk, Vol. 16 No. 2.
- 30
31 Kirkpatrick, G. (2009), "The corporate governance lessons from the financial crisis", OECD
32 Journal: Financial Market Trends, Vol. 2009 No. 1, pp.61-87.
- 33
34 Lingel, A. and Sheedy, E. A. (2012), "The Influence of Risk Governance on Risk Outcomes –
35 *International Evidence*", Macquarie Applied Finance Centre Research Paper 37,
36 available at SSRN: <https://ssrn.com/abstract=2187116> (accessed 21 June 2023).
- 37
38 Lubberink, M. J. P., and Willett, R. J. (2023), "How sensitive are bank market values to
39 *regulatory adjustments of capital*", Available at SSRN 4172870.
- 40
41 McNulty, T., Florackis, C., and Ormrod, P. (2013), "Boards of directors and financial risk
42 during the credit crisis", Corporate Governance: An International Review, Vol. 21 No.
43 1, pp. 58–78.
- 44
45 Minton, B. A., Taillard, J. P., and Williamson, R. (2014), "Financial Expertise of the Board, Risk
46 *Taking, and Performance: Evidence from Bank Holding Companies*", Journal of
47 Financial and Quantitative Analysis, Vol. 49 No. 2, pp. 351–380.
- 48
49 Mongiardino, A., and Plath, C. (2010), "Risk governance at large banks: have any lessons
50 been learned?", Journal of Risk Management in Financial Institutions, Vol. 3, pp.
51 116–123.
- 52
53
54 Nguyen, Q. K. and Dang, V. C. (2022), "The impact of risk governance structure on bank risk
55 *management effectiveness: evidence from ASEAN countries*", Heliyon, Vol. 8 No. 10,
56 e111192–e111192. <https://doi.org/10.1016/j.heliyon.2022.e111192>.
- 57
58
59
60

- 1
2
3 Quintyn, M. and Chenard, K. (2004), *“Does Regulatory Governance Matter for Financial*
4 *System Stability? An Empirical Analysis,”* IMF Working Paper No. 04/89, available at
5 SSRN: <https://ssrn.com/abstract=878912> (accessed 21 June 2023).
6
7 Rachdi, H., and Ben Bouheni, F. (2016), *“Revisiting the effect of regulation, supervision, and*
8 *risk on banking performance: Evidence from European banks based on PSTR model”*,
9 *Journal of Financial Regulation and Compliance*, Vol. 24 No. 1, pp. 24–40.
10
11 Srivastav, A. and Hagendorff, J. (2016), *“Corporate governance and bank risk-taking”*,
12 *Corporate Governance: An International Review*, Vol. 24 No. 3, pp.334-345.
13
14 Stock, J.H., and Watson, M.W. (2008), *“Heteroskedasticity-Robust Standard Errors for Fixed*
15 *Effects Panel Data Regression”*, *Econometrica*, Vol. 76 No. 1, pp. 155–174.
16 <https://doi.org/10.1111/j.0012-9682.2008.00821.x>.
17
18 Stolz, S., Heid, F., and Porath, D. (2003), *“Does capital regulation matter for bank behavior?*
19 *Evidence for German savings banks”*, Kiel Working Paper, No. 1192, Kiel Institute for
20 the World Economy (IfW), Kiel.
21
22 Streukens, S., and Leroi-Werelds, S. (2016), *“Bootstrapping and PLS-SEM: A step-by-step*
23 *guide to get more out of your bootstrap results”*, *European Management Journal*,
24 Vol. 34 No. 6, pp. 618-632.
25
26 Van Greuning, H. and Bratanovic, S.B. (2020), *“Analyzing Banking Risk: A Framework for*
27 *Assessing Corporate Governance and Risk Management,”* World Bank Publications.
28
29 Yao, J., Hisham Noori Hussain, A. H., Waleed Noori, H., and Haider Noori, H. (2023),
30 *“Comparative Analysis of the Global Banking System A Study of the American and*
31 *Chinese Banking Regulations,”* *International Journal on Economics, Finance and*
32 *Sustainable Development*, Vol. 5(No. 11), pp. 73-82.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Journal of Financial Regulation and Compliance