THE IMPACT OF CORPORATE GOVERNANCE ON DEFAULT RISK: BERTOPIC LITERATURE REVIEW

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Abstract

This study utilizes the BERTopic methodology, a topic modelling tool that facilitates a meticulous exploration of existing literature, to comprehensively review the interplay between corporate governance and default risk. Through analysis of diverse empirical studies, it delves into understanding how corporate governance practices influence default probability. The study underscores the importance of effective governance mechanisms — board attributes, ownership structures, executive compensation, shareholder rights, and disclosure practices — in molding default probabilities. It also highlights the role of external governance mechanisms and regulatory frameworks in managing default risk. Notably, this research advocates for further investigation into emerging governance models and their integration with modern machine-learning techniques to amplify their impact.

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1. INTRODUCTION

In recent years, the intersection of corporate governance and the probability of default has garnered significant attention from scholars, practitioners, and policymakers (Dallocchio, Ferri, et al., 2022). As the global business landscape becomes increasingly complex and interconnected, understanding the relationship between corporate governance practices and default risk has become a necessity for ensuring financial stability and sustainable growth. As default events continue to pose significant challenges to financial markets, investors, and the broader economy, understanding the factors that influence default risk and the role of corporate governance in mitigating such risks has become paramount.

Therefore, this literature review aims to address this need by critically examining and synthesizing the existing body of research on the relationship between corporate governance and the probability of default in order to answer the following research question:

RQ: How and which specific corporate governance variables impact the likelihood of default?

By conducting a systematic analysis of relevant scholarly articles, industry reports, and empirical studies, we aim to provide a comprehensive overview of the current state of knowledge in this field. This review not only consolidates the existing research findings but also highlights the gaps and limitations in the current literature, thereby paving the way for future research and guiding the development of effective governance practices to mitigate default risk.

To shed light on this critical issue, this research paper adopts the BERTopic methodology, which represents a novel and powerful approach for analyzing and uncovering underlying patterns and relationships within vast bodies of textual data (Grootendorst, 2022). The utilization of the BERTopic methodology in this study offers a unique advantage, as it enables a comprehensive and nuanced exploration of the literature on corporate governance and the probability of default. By employing this innovative approach, we can

capture the essence of existing research, identify key themes, and extract valuable insights from a diverse range of scholarly articles, reports, and studies. The incorporation of BERTopic as a methodological framework enhances the robustness and accuracy of our analysis, allowing for a more nuanced understanding of the intricate dynamics at play in the field of corporate governance and default risk.

Thanks to this methodology, the research emphasizes the significance of proficient governance mechanisms, encompassing board attributes, ownership structures, executive compensation, shareholder rights, and disclosure practices, in shaping the probabilities of default. Moreover, it brings to light the influence of external governance mechanisms and regulatory frameworks in effectively handling default risk. Furthermore, this study highlights the need for a deeper exploration of emerging governance models and their synergistic integration with contemporary machine learning techniques to enhance their effectiveness.

The insights gained from this study have practical implications for practitioners, policymakers, and regulators, offering valuable guidance in the design and implementation of effective governance frameworks that promote financial stability, mitigate default risk, and enhance the overall resilience of firms and the financial system.

The structure of this paper unfolds as follows. Section 2 offers an extensive literature review, constructing the theoretical foundation supporting the study's hypotheses. Section 3 delineates the employed methodology. Section 4 presents the obtained findings, succeeded by a comprehensive discussion of these outcomes in Section 5. The paper draws to a close with a concise summary of the derived conclusions and an exploration of their implications for future research avenues in Section 6.

2. LITERATURE REVIEW

Corporate governance has emerged as a critical area of inquiry in the realm of finance and management, attracting significant attention from researchers, policymakers, and market participants. It represents a set of principles, practices, and mechanisms that guide and monitor the conduct of corporations, aiming to ensure accountability, transparency, and effective decision-making within organizations. The importance of corporate governance stems from its potential to shape the financial stability and performance of firms, including their probability of default (Dallocchio, Caputo, et al., 2022).

The probability of default, commonly referred to as default risk, is a fundamental concern for various stakeholders, including investors, creditors, regulators, and the broader financial system. Default events can have severe consequences, leading to significant financial losses, disruptions in the credit market, and adverse economic impacts (Trahms et al., 2013). Therefore, understanding the factors that influence default risk and developing effective risk management strategies are crucial for maintaining the stability and resilience of firms and the overall economy.

The relationship between corporate governance and the probability of default has been the subject of extensive research, seeking to uncover the mechanisms through which governance practices

and structures impact default probabilities (Lajili & Zeghal, 2017; Appiah & Chizema, 2016; Ntim, 2015). Scholars have explored various dimensions of corporate governance, including board attributes, ownership structure, executive compensation, shareholder rights, disclosure practices, and the role of external governance mechanisms.

Empirical studies have provided insights into the relationship between corporate governance and default risk, highlighting the significance of governance mechanisms in mitigating agency conflicts, aligning stakeholders' interests, and promoting sound risk management practices (Donaldson & Davis, 1991). For instance, effective board structures, such as independent boards and diverse board compositions, have been found to enhance risk oversight and decision-making, potentially reducing default probabilities (Fich & Slezak, 2008).

In addition, the protection of shareholder rights, the presence of robust regulatory frameworks, and the effectiveness of external governance mechanisms contribute to a healthier governance environment, potentially reducing default risk. Strong shareholder rights foster accountability and transparency, while regulatory oversight and market discipline promote market integrity and risk mitigation efforts (Jackson & Moerke, 2005).

3. RESEARCH METHODOLOGY

This research adopts the BERTopic methodology, which is a topic modeling method that utilizes BERT (bidirectional encoder representations from transformers) embeddings to extract coherent and meaningful topics from text data. It combines the strengths of BERT's contextualized word representations and graph clustering techniques (Grootendorst, 2022). The BERTopic method consists of the following steps:

1. *Preprocessing*: The input text data is preprocessed by applying techniques such as tokenization, stop word removal and text normalization. This step prepares the data for further analysis.

2. *BERT embeddings*: BERT embeddings are generated for each document in the corpus using a pre-trained BERT model. BERT captures rich semantic information by considering the context of each word in a document. These contextualized embeddings represent the meaning of words in the context of the entire document.

3. *Dimensionality reduction of embeddings*: The BERT embeddings are reduced in dimensionality using the UMAP (uniform manifold approximation and projection) algorithm, in order to prepare the vectors to be clustered without incurring in the "curse of dimensionality".

4. *Embedding clustering*: The BERT embeddings are clustered using graph-based algorithms, with HDBSCAN (hierarchical density-based spatial clustering of applications with noise) being a commonly used approach. Clustering groups similar documents together based on the similarity of their BERT embeddings.

5. *Topic representation*: Representative keywords are extracted for each topic cluster based on the BERT embeddings. These keywords are terms that are most salient and characteristic of each topic cluster.

6. *Topic ranking*: A ranking mechanism assigns a score to each topic based on the coherence and frequency of its associated keywords. This step helps identify the most prominent and meaningful topics in the corpus. Therefore, by combining clustering and keyword extraction, BERTopic produces coherent and distinct topics that capture the underlying themes present in the text data. It leverages the contextualized embeddings of BERT to capture the nuances of the language and generate more accurate topic representations.

BERTopic has shown promising results in various applications, such as document clustering, trend analysis, and content recommendation (Grootendorst, 2022). Its ability to handle large amounts of data and capture the context of words has made it a valuable tool in the field of natural language processing and text mining (Grootendorst, 2022) and, therefore, suitable for a literature review. Moreover, the BERTopic model offers several advantages over the traditional Latent Dirichlet Allocation (LDA) model used in past research (Ligorio et al., 2022) since it is capable of identifying topics of varying sizes and hierarchies and outperforms LDA when dealing with short texts or documents with limited context (Grootendorst, 2022).

Furthermore, in the present research, a bibliometric analysis was conducted following the guidelines of Donthu et al. (2021) in order to analyze publication trends, influential journals, authors, and countries (Viglia et al., 2022; Caputo et al., 2021; Pizzi et al., 2020). Bibliometric analysis, a discipline within the realm of scientometrics, employs statistical techniques to investigate the scientific landscape of a specific research domain (Broadus, 1987). It is based on two core methodologies: science mapping and performance analysis (Aria & Cuccurullo, 2017). Performance analysis focuses on activity indicators (Dabic et al., 2020; Mingers & Leydesdorff, 2015) to collect data on research volume and impact. This involves employing diverse techniques, such as word frequency analysis, citation analysis, and quantifying publications based on various units of analysis, such as authorship, country, and affiliation. On the other hand, science mapping uses first and second-generation relation indicators to visually represent the interconnectedness of scientific elements (Caputo et al., 2019). The main goal of science mapping is to show the structural and dynamic organization of knowledge within the investigated research field (Iwami et al., 2020). In this study, bibliometric analysis was conducted to explore prominent publication journals and highly cited authors. The analysis utilized performance analysis tools to identify trends regarding influential institutions and dominant nations within the field. Furthermore, a keyword co-occurrence analysis was added to better comprehend the scholarly landscape (Anayat & Rasool, 2022). The analysis was conducted in VOSviewer (van Eck & Waltman, 2010) and bibliometrix in R.

The multifaceted approach applied in this research enables a comprehensive exploration of the subject matter, ensuring the incorporation of various dimensions and establishing meaningful connections within the body of literature in a rigorous and more objective way (Kraus et al.,

2021). Moreover, by conducting a comprehensive bibliometric analysis, we uncover influential publications and discern the overarching trends within this domain. An additional advantage lies in integrating quantitative analysis with a systematic literature review, thereby ensuring unbiased and objective conclusions (Goodell et al., 2023; Patel et al., 2022).

The present study employed Python and R programming languages to conduct the analysis, which took place during the month of May 2023.

3.1. Data collection

The citation databases, Web of Science (WoS) and Scopus, are commonly utilized by scholars for conducting bibliometric reviews. Given that the interest in corporate governance has predominantly emerged since the late 1990s, the Scopus index was deemed most appropriate for the objectives of this review since it is considered the largest and most complete scientific literature database for scholarly work (Baas et al., 2020). This assertion aligns with the perspective of other scholars specializing in management studies (Zheng & Kouwenberg, 2019; Mongeon & Paul-Hus, 2016).

To ensure methodological rigor, we adhered to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines proposed by Moher et al. (2009). These guidelines outline a structured approach comprising four essential steps to identify and extract information for conducting systematic research reviews which are described in Figure 1.

Figure 1. PRIMA flow diagram
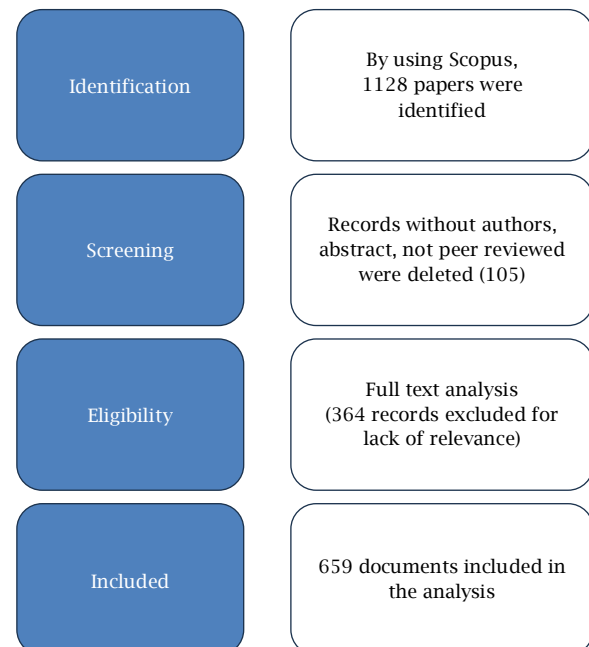
Source: Moher et al. (2009).

The literature search, based on various previous literature in the field of corporate governance (Zheng & Kouwenberg, 2019) and bankruptcy (Altman et al., 2020), was conducted on 15 May 2023, yielding a total of 1128 journal articles in the English

language. The code and the list of keywords used for extracting the papers from Scopus can be found in Table 1. The search terms had to be set quite broadly in order to avoid excluding relevant papers.

Table 1. Scopus code

TITLE-ABS-KEY ("distress" OR "financial risk" OR "bankruptc*" OR "business failure*" OR "default" OR "financial failure" OR "insolvency" OR "credit risk" AND "corporate governance" OR "CG" OR "Ownership" OR "Code of Conduct" OR "Code of governance" OR "Ownership concentration" OR "Board" OR "director" OR "Corporate Practice" OR "CEO" OR "board structure" OR "board characteristic" OR "board composition" AND NOT "bank" OR "banks" OR "banking") AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SUBJAREA, "ECON") OR LIMIT-TO (SUBJAREA, "BUSI")) AND (EXCLUDE (PUBYEAR, 2023)) AND (LIMIT-TO (LANGUAGE, "English"))

In the subsequent phase, we implemented exclusion criteria to refine the database. Firstly, documents lacking author names were removed, as were documents that solely constituted board of directors' reports or statements, rather than research articles. Additionally, we excluded all publications predating 1996, as Scopus exhibits limited coverage of pre-1996 publications in the fields of economics and social sciences (Harzing & Alakangas, 2016). Moreover, articles from the current year, 2023, were excluded to delimit the review scope to the period spanning from 1996 to 2022. Following these exclusion criteria, a total of 105 articles were eliminated.

Subsequently, the titles and abstracts of the remaining articles underwent a manual screening process to assess their relevance to the present review. This meticulous evaluation led to the exclusion of an additional 364 documents, comprising articles that were erroneously included by Scopus and duplicates. Consequently, the final database comprised 659 peer-reviewed journal articles on the subject of bankruptcy and corporate governance.

3.2. BERTopic analysis

In order to use the BERTopic method, it was necessary to preprocess the collected texts. The primary objective of this preprocessing stage was the removal of punctuations, special characters, web addresses, and new line characters. The output of this preprocessing step yielded a collection of sentences. In the subsequent steps, the BERTopic method employed the HDBSCAN algorithm as the clustering algorithm. Prior to clustering, the dimensionality of the embeddings, which are vectors representing the documents with semantic meaning, was reduced with the UMAP dimensionality reduction algorithm. The lower the distance between the reduced vectors, the greater the similarity between the corresponding documents.

HDBSCAN, a state-of-the-art algorithm, possesses two noteworthy characteristics. Firstly, it autonomously determines the number of clusters based on the topological properties of the provided data points. This automatic cluster selection feature eliminates the need for manual specification of the cluster count. Secondly, HDBSCAN effectively identifies outliers, which are data points that do not exhibit sufficient proximity to other data points.

Such outliers are assigned to a special cluster labeled as -1. This automatic detection of outliers enhances the robustness of the clustering process. Once the topics are effectively identified focusing on the more meaningful documents, outlying documents are automatically remapped to the closest topic among the ones discovered.

4. RESEARCH RESULTS

4.1. Descriptive results

In Figure 2, the number of articles published for every year is shown.

Figure 2. Number of articles published per year
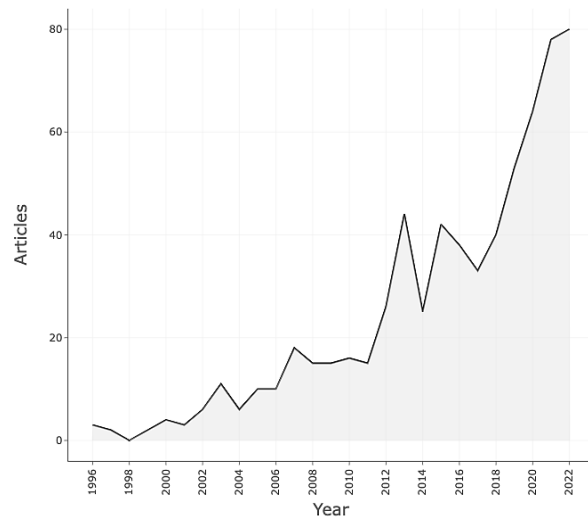
Source: Author's elaboration.

In terms of publication trends, a total of 659 journals have contributed to the publication of research in this field. On average, the annual output stands at 24.41 publications per year.

Among the published works, there are 120 single-authored publications and 539 co-authored articles, illustrating the collaborative nature of bankruptcy research within the corporate governance domain.

The results show an increasingly growing interest in the relationship between corporate governance and bankruptcy, especially in the period 2020–2022.

This shows that the relationship between corporate governance and bankruptcy garnered significant attention from management scholars in recent years, leading to the emergence of a substantial body of research with an annual growth rate of 13.46%.

Subsequently, the analysis of the authors has been used to provide further insights. It becomes apparent that this research stream comprises diverse and heterogeneous communities of scholars. The dataset used for analysis consisted of 1481 authors contributing to 659 publications. On average, each author received 18.85 citations (standard deviation = 44.83). However, only 344 publications received more than 5 citations. The analysis conducted in Table 2 sheds light on

the number of published articles and provides insights into the most prolific scholars in the field. In terms of identifying the most influential scholar, we examined the total citations received by each author. The findings reveal that Bhojraj S. and Sengupta P. are the most prolific authors, with a remarkable total citation count of 653.

Following this, the examination of the papers has yielded additional insights, with Table 3 showcasing the top five most referenced documents.

Table 2. Most influential authors

Journal	Citation
Bhojraj S.	653
Sengupta P.	653
Carcello J.	499
Neal T.	499
Wright M.	444
Ucbasaran D.	423
Westhead P.	423
Renneboog L.	306
Zellweger T.	280
Cassell C.	270

Table 3. Most cited documents

Authors	Journal	Year	Citation	Title
Bhojraj S., and Sengupta P.	*Journal of Business*	2003	653	"Effect of Corporate Governance on Bond Ratings and Yields: The Role of Institutional Investors and Outside Directors"
Ucbasaran D., Westhead P., and Wright M.	*Journal of Business Venturing*	2009	423	"The Extent and Nature of Opportunity Identification by Experienced Entrepreneurs"
Carcello J., and Neal T.	*Corporate Governance*	2000	76	"Audit Committee Independence and Disclosure: Choice for Financially Distressed Firms"
Zellweger T.	*Family Business Review*	2007	280	"Time Horizon, Costs of Equity Capital, and Generic Investment Strategies of Firms"
Kaplan S., and Minton B.	*International Review of Financial Analysis*	2012	226	"How Has CEO Turnover Changed?"

Leading the field is the article titled "Effect of Corporate Governance on Bond Ratings and Yields: The Role of Institutional Investors and Outside Directors", co-authored by Bhojraj and Sengupta. This is closely followed by the work titled "The Extent and Nature of Opportunity Identification by Experienced Entrepreneurs", written by Ucbasaran, Westhead, and Wright.

Following this, the examination of the journals has yielded additional insights. The journals were arranged by the count of articles and total citations, as depicted in Table 4.

Table 4. Most influential journals

Journal	No. Doc.	Journal	Citations
Corporate Ownership and Control	22	*Journal of Business*	653
Journal of Corporate Finance	18	*Journal of Financial Economics*	636
Corporate Governance	12	*Corporate Governance: An International Review*	550
Corporate Governance: An International Review	12	*Accounting Review*	484
Journal of Business Finance and Accounting	11	*Corporate Governance*	480
Quarterly Review of Economics and Finance	11	*Journal of Corporate Finance*	462
European Business Organization Law Review	9	*Journal of Business Research*	453
Journal of Business Research	9	*Journal of Business Venturing*	423
Journal of Financial Economics	9	*Corporate Governance: The International Journal of Business in Society*	374
Managerial Finance	9	*Family Business Review*	347

In terms of total citations, the most influential journals include the *Journal of Business, Journal of Financial Economics,* and *Corporate Governance: An International Review*. In terms of the total number of published papers, the most impactful sources are *Corporate Ownership and Control, Journal of Corporate Finance,* and *Corporate Governance.*

Subsequently, the examination of geographical distribution has furnished additional insights. The ratio of papers co-authored internationally stands at 26.25%. Notably, Table 5 spotlights the most impactful countries in this domain.

Table 5. Most influential countries

Country	Citation
USA	2316
UK	1173
Australia	1117
China	712
Canada	545
Malaysia	504
Netherlands	396
Germany	321
Italy	201
New Zealand	194

Evaluating the cumulative citations, the United States and the United Kingdom emerge as the most influential nations.

Moreover, we employ a keyword co-occurrence analysis to delve into the fundamental themes that permeate the subject matter. This analysis technique allows us to uncover the interrelationships and co-occurrence patterns of keywords within the dataset, shedding light on the essential themes that emerge from the literature. By examining the frequencies of keyword co-occurrences, we gain valuable insights into the underlying themes and their associations, enabling a comprehensive understanding of the research landscape. The results are shown in Figure 3.

Figure 3. Co-occurrence keywords
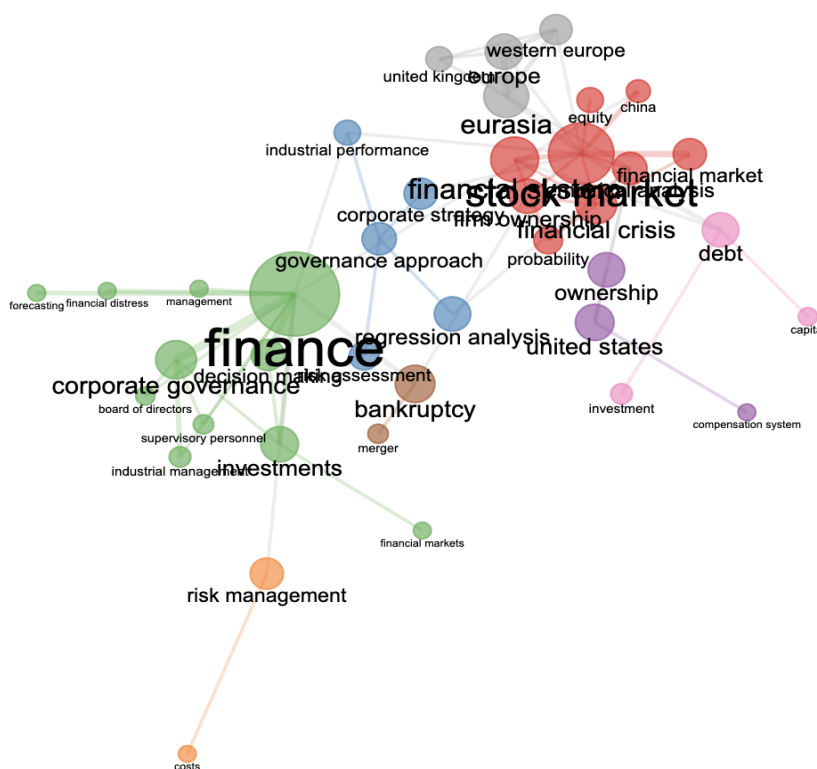
However, as previously highlighted, the BERTopic model was used for more precisely identifying the key topics of the field.

4.2. BERTopic results

In this research, the BERTopic model, which is the core focus of this study, was employed to extract and delineate the prominent topics that dominate the literature on sustainability in urban settings. By utilizing this model, we aimed to identify the most frequently discussed topics within the collection of documents. Moreover, through our analysis, we were able to ascertain the distribution of these topics within the dataset and identify the predominant document linked to each respective topic. The examination allowed us to gauge the relative presence of each topic, shedding light on their prominence and significance within the dataset. Additionally, by identifying the most relevant document for each topic, we gained valuable insights into the specific content and context associated with those topics.

The findings derived from our analysis have unveiled a network of interconnected topics, shedding light on seven distinct research trends within the domain of corporate governance and bankruptcy. These topics encompass a range of focal points, including "auditor", "CEO", "board diversity", "corporate governance", "family firm", "ownership

structure", and "board attributes". The identification of these topics provides valuable insights into the diverse areas of interest and research focus that have emerged in studies exploring the intricate relationship between corporate governance and bankruptcy.

In Table 6, the results of the BERTopic model are shown, where the seven topics found are highlighted.

In Figure 4, the intertropical distance map is shown.

Table 6. BERTopic results

Topic	Keywords	Trend
0	'earnings' 0.32386048072940593 + 'companies' 0.31439272444752414 + 'auditors' 0.30381305531715486 + 'reporting' 0.2978071469797377 + 'governance' 0.2702117435276789 + 'enron' 0.24221992043561147 + 'information' 0.23704393428016063 + 'factors' 0.2345915099824385 + 'quality' 0.23380636670071345 + 'distressed' 0.2335866493962466	*Auditor*
1	'ceo' 0.4270996529994945 + 'risk' 0.3198326862891258 + 'firms' 0.31061451660314626 + 'incentives' 0.30545373289166095 + 'equity' 0.29997970141894015 + 'volatility' 0.27869097384905145 + 'holdings' 0.2542114781474983 + 'turnover' 0.2535014238630563 + 'paper' 0.2521682798270666 + 'creditors' 0.24938250665262246	*CEO*
2	'diversity' 0.37196935135779075 + 'financial' 0.3616172924165723 + 'board' 0.35222175429620234 + 'distress' 0.32739795146255746 + 'csr' 0.30093248487252827 + 'sustainability' 0.2892170716459833 + 'implications' 0.279444862910252 + 'women' 0.26073353666477345 + 'corporate' 0.2575807505341077 + 'relationship' 0.25721920674585236	*Board diversity*
3	'governance' 0.4024498116175392 + 'default' 0.39355734332332076 + 'bond' 0.27782473169294486 + 'prediction' 0.2672671377043376 + 'cds' 0.26333141653119085 + 'companies' 0.2513540493613549 + 'study' 0.2460152684852355 + 'measure' 0.245937035384432 + 'debt' 0.2412146068141182 + 'countries' 0.23873349027557542	*Corporate governance*
4	'family' 0.761768476129368 + 'firms' 0.3561644405334537 + 'cfos' 0.3217386219367177 + 'success' 0.3187252152229362 + 'financial' 0.31430332328637384 + 'venture' 0.3119917856890115 + 'ownership' 0.29345212909982293 + 'case' 0.2888066057414382 + 'brazilian' 0.28547829328655205 + 'promoter' 0.2785137141390372	*Family firm*
5	'ownership' 0.4107380975559281 + 'structure' 0.39529549828289184 + 'capital' 0.3831793265841864 + 'listed' 0.29772124102202996 + 'governance' 0.2861801550313851 + 'companies' 0.28542658122446113 + 'liquidity' 0.2672348233376294 + 'managerial' 0.2548854135141796 + 'bankruptcy' 0.2516578281573549 + 'direct' 0.24644748308902964	*Ownership*
6	'insolvency' 0.409234635327204 + 'board' 0.3904918854374912 + 'firms' 0.3338512971414802 + 'turnaround' 0.3303531807122706 + 'governance' 0.2995027689511053 + 'private' 0.2864847608034272 + 'ceo' 0.2771139636862411 + 'targets' 0.2687245171815488 + 'findings' 0.26424272600517573 + 'resource' 0.25982247723522217	*Board attributes*

Figure 4. Intertopic distance map
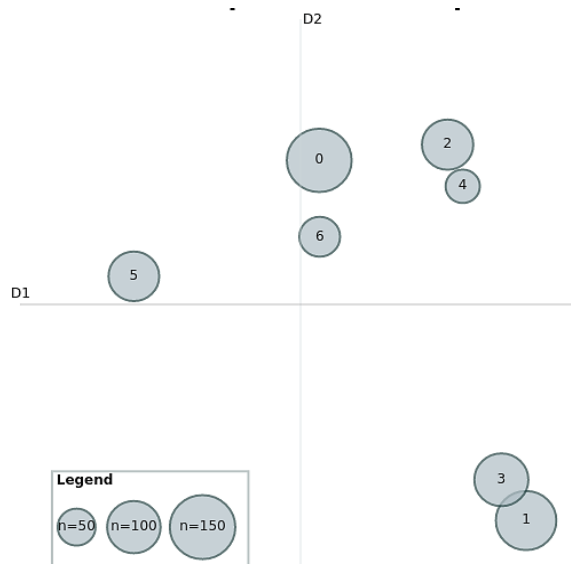
Note: Legend: 0 — Auditor, 1 — CEO, 2 — Board diversity, 3 — Corporate governance, 4 — Family firm, 5 — Ownership, 6 — Board attributes.

Through visual examination of the circles, it becomes apparent that the "auditor" topic (labelled as number 0) exerts the greatest influence among the analyzed texts, followed by the "CEO" topics.

The proximity between topics is also evident, particularly between the "CEO" topics and "corporate governance" topics, as their circles overlap, indicating a strong interlinkage. Additionally, topics 2 ("board diversity") and 4 ("family firm") exhibit a moderate degree of proximity. This observation provides compelling evidence of interest in the linkage between family firm and board diversity revolves around how family influence and dynamics may affect the composition and functioning of the board. Conversely, the remaining topics display no overlapping and occupy different coordinates on the map, indicating their independence and distinct nature as four separate topics.

In Figure 5, the most salient terms by topic, are presented.

Figure 5. Most salient term by topic
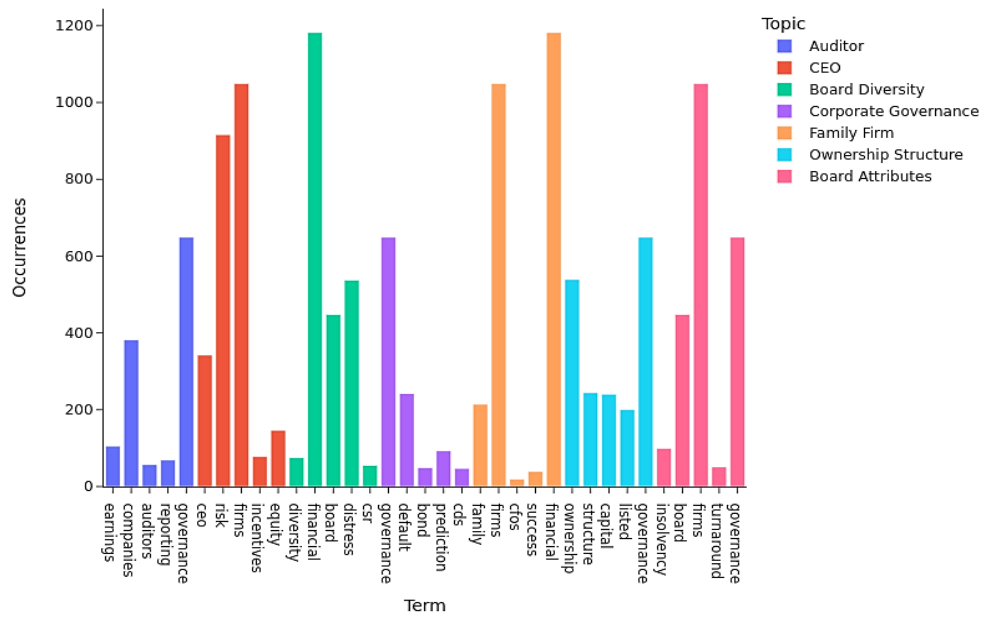
This output focuses on the most influential words that have contributed to shaping the identified topics. In the context of this study, particular attention was given to the top 30 most relevant words.

Notably, a clear centrality is observed around the terms "governance", "risk", "corporate" and "firms" indicating the increasing role of corporate governance in predicting bankruptcies. This finding aligns with previous research, highlighting the consistency and coherence of the results across studies (Dallocchio, Ferri, et al., 2022). Moreover, the significance attributed to the term "ownership" underscores the presence of an insufficient governance system, coupled with the absence of a clear demarcation between ownership and management, as posited by the agency theory (Tron, 2021). Furthermore, the importance of the term "ownership" highlights, in line with the principles of agency theory, the risk of ownership concentration which could indicate the absence of a clear demarcation between ownership and management,

coupled with an inadequate governance framework (Scafarto et al., 2017). Similarly, the influence of the word "board" highlights the role of the relationship between board role and bankruptcy in the context of corporate governance. The board of directors holds a critical position in corporate governance, responsible for overseeing strategic decisions and safeguarding the interests of stakeholders. Thus, the board plays a crucial role in influencing bankruptcy probability through its composition, expertise, monitoring functions, strategic leadership, and risk oversight. Understanding the mechanisms through which the board influences bankruptcy risk enhances the effectiveness of corporate governance practices and contributes to the overall financial stability and survival of firms (Fernando et al., 2020).

In order to augment the evidential support for the outcomes of the model, a methodology was employed to determine the distribution of topics across the documents and examine the influence of each topic on the documents, as shown in Figure 6.

Figure 6. Topic distribution among documents
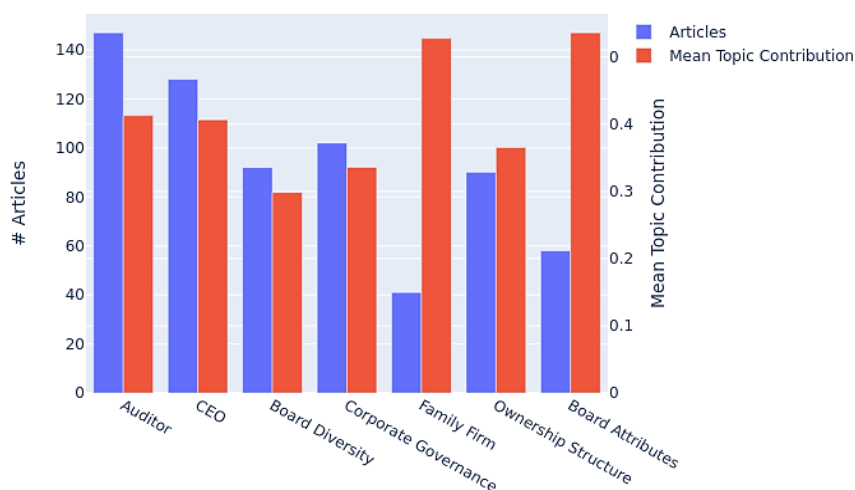
The analysis demonstrated that each topic was represented in a minimum of 40 documents. Amongst these topics, the topic "auditor" exhibited the highest performance, being the predominant focus in more than 140 documents, due to the importance of audit reports for all stakeholders.

The relationship between auditors and bankruptcy is multifaceted and encompasses various aspects. Auditors, as independent professionals, play a critical role in the financial reporting process of companies. They are entrusted with assessing and expressing an opinion on the accuracy and reliability of financial statements, providing assurance to stakeholders, including investors, creditors, and regulatory bodies. A large body of literature (among others, Cenciarelli et al., 2018), is dedicated to the ability of the auditor to reduce and anticipate the likelihood of default, in general recognising their benefit in reducing the default probability (Cenciarelli et al., 2018).

The median value of documents per topic was found to be around 90, while the mean value stood at 92, confirming a balanced distribution of topics across the documents.

In Figure 9, also the prevalence of the main topic within the documents is shown through mean topic contribution, leading to the determination that the two topics which are more "predominant" in the papers were "family firm" and "board attributes". This highlights the fact, that independently from the thematic analyzed in the field, the board and the ownership of a company, especially if is a family firm or not, are key factors that are studied and present in the majority of the papers.

Despite its growing interest, the least performing topic is "board diversity", probably due to the fact that the theme has gained attention only in the last years (Morrone et al., 2023).

As a further test, a similarity test was conducted which confirmed previous results.

In order to discern the distribution of topics across journals, the findings of both the bibliometric analysis and the BERTopic model were juxtaposed. The outcomes of this comparison are succinctly presented in Table 7, which offers a comprehensive summary of the topic distribution within the five most significant journals for each respective topic.

Table 7. Distribution of journals per topic

Journal rank	Auditor	CEO	Board diversity
1	Corporate Governance	Journal of Corporate Finance	Corporate Governance
2	European Business Organization Law Review	Journal of Financial Economics	Cogent Business & Management
3	Corporate Ownership and Control	Journal of Banking and Finance	Finance Research Letters
4	Managerial Auditing Journal	Quarterly Review of Economics and Finance	Managerial Auditing Journal
5	Cogent Economics & Finance	European Financial Management	Journal of Applied Business Research
Journal rank	Corporate governance	Family firm	Ownership
1	Journal of Corporate Finance	Journal of Family Business Management	Corporate Ownership and Control
2	Corporate Ownership and Control	Journal of Business Strategy	Corporate Governance
3	Emerging Markets Finance and Trade	Problems and Perspectives in Management	Managerial Finance
4	International Review of Economics & Finance	Family Business Review	Management Science
5	Journal of Business Research	Corporate Ownership and Control	Investment Management and Financial Innovations
Journal rank	Board attributes		
1	Corporate Governance		
2	Journal of Corporate Finance		
3	International Journal of Applied Business and Economics Research		
4	Journal of Business Finance and Accounting		
5	Advances in Accounting		

Notably, the most preeminent journals are the *Journal of Corporate Finance, Corporate Governance,* and *Corporate Ownership and Control.* However, an exception arises for the topic "family firm" where the most influential journal is the *Journal of Family Business Management.*

5. DISCUSSION OF THE RESULTS

As mentioned before, the BERTopic model has highlighted seven main topics and trends studied in the field of the relationship between corporate governance and bankruptcy. In the following subsections, the identified topics will undergo thorough and comprehensive analysis.

5.1. Auditor

The topic "auditor" has been extensively examined in the existing literature, reflecting the crucial role auditors play in financial risk assessment. Numerous studies have sought to investigate the impact of auditor characteristics, such as industry expertise, audit firm size, independence, and auditor

tenure, on default probabilities (Gaver & Utke, 2019; Callaghan et al., 2009; Robinson, 2008).

Research consistently indicates that auditors with industry expertise are associated with lower default probabilities. Specialized auditors possess a deeper understanding of sector-specific risks, leading to more accurate financial assessments and reduced default likelihood (Cenciarelli et al., 2018; Reichelt & Wang, 2010). Large audit firms have also been found to have a significant influence on default probabilities by offering greater resources, expertise, and reputation for effective risk management (Kaplan & Williams, 2012; Geiger & Rama, 2006). The length of auditor tenure has been another focal point in exploring the auditor-default relationship. Longer auditor tenure has been linked to a reduced probability of default, as auditors with a longer history of engagement with a firm develop greater knowledge and familiarity with the firm's operations and financial condition, enabling them to provide more accurate risk assessments (Knechel & Vanstraelen, 2007; Ghosh & Moon, 2005). Furthermore, audit fees indicate default probability, with higher fees correlating to increased risk (Geiger & Rama, 2003).

5.2. CEO

The connection between CEO roles and default probability has garnered substantial research interest, reflecting the pivotal influence of executive leadership on firm outcomes (Dallocchio, Caputo, et al., 2022). Investigations in this realm have explored various CEO attributes and behaviors impacting default risk.

Empirical findings highlight CEO expertise and experience as key in lowering default probability (Platt & Platt, 2012; Hutzschenreuter et al., 2012). CEOs with industry-specific knowledge and prior experience demonstrate superior comprehension of market dynamics and risk factors, decreasing the likelihood of default. CEO tenure has also been scrutinized as a default risk determinant (Darouichi et al., 2021; Eckbo & Thorburn, 2003). Research indicates extended CEO tenure correlates with reduced default probability. Longer tenures facilitate firm-specific knowledge accumulation and effective risk management, contributing to lower default risk. CEO overconfidence emerges as a significant default probability factor. Overly confident CEOs may take excessive risks, pursue aggressive strategies, and disregard warning signs, elevating default likelihood (Yu, 2014; Milidonis & Stathopoulos, 2014). CEO compensation structures have also garnered attention in relation to default risk (Jones, 2017). CEOs with substantial equity-based compensation possess stronger incentives for risk mitigation, leading to lower default probability. CEO succession impacts on default risk have been explored (Dallocchio, Caputo, et al., 2022). CEO successions, particularly unplanned turnovers, can disrupt operations and escalate default risk. However, findings on CEO renewal's relationship with firm performance are mixed (Dallocchio, Caputo, et al., 2022; Bennedsen et al., 2020; Dardour et al., 2018). Moreover, the analysis is still focused on large companies located in a few countries (Domínguez-CC & Barroso-Castro, 2017). CEO reputation and social

capital's influence on default probability have also been examined. CEOs with strong reputations and broad networks access external resources, reducing default likelihood (Eckbo & Thorburn, 2003).

5.3. Board diversity

The relationship between the role of board diversity and the probability of default has gained substantial attention in the literature, reflecting the growing recognition of the impact of board composition on firm outcomes.

Scholarly work indicates that gender diversity on corporate boards can correlate with a reduced likelihood of default (Morrone et al., 2023; Cardillo et al., 2021). The broader range of perspectives, skills, and experiences that gender diversity brings to decision-making processes is believed to enhance board efficacy, promote robust risk assessment, and thus mitigate default risk (Zaid et al., 2020). Ethnic and racial diversity's link with default probabilities has also been examined. Diverse boards comprising members from varied ethnic and racial backgrounds foster a wider spectrum of viewpoints and enhance problem-solving capacities, ultimately diminishing the probability of default (Johnson et al., 2012; Ntim, 2015). Furthermore, investigations have probed the impact of board diversity in terms of professional backgrounds and expertise (García et al., 2022; Platt & Platt, 2012). Boards featuring directors with diverse expertise, spanning finance, law, and technology, bring complementary skills to risk assessment and strategic decision-making, potentially curbing default risk. Similar attention has been devoted to the influence of board diversity in terms of educational backgrounds and industry experience (Johnson et al., 2012; Bhagat et al., 2010). Boards with varied educational and industry experiences can tap into a wider knowledge pool, enabling comprehensive risk assessment and potentially reducing default likelihood.

5.4. Corporate governance

The attention given to the role of corporate governance and the probability of default reflects the crucial role of governance mechanisms in shaping firm outcomes. Scholarship in this realm has delved into diverse facets of corporate governance and their implications for default risk.

The efficacy of board committees, like audit and risk committees, in mitigating default risk has been explored (Nugroho et al., 2021; Bhuiyan et al., 2021). Functioning with independent and qualified members, these committees enhance oversight, internal controls, and risk management, leading to reduced default likelihood (Appiah & Chizema, 2016). The impact of external governance mechanisms, such as regulatory frameworks and market discipline, on default risk has been also examined (Lajili & Zeghal, 2017). Robust regulatory oversight and market surveillance act as deterrents to default risk by ensuring compliance, transparency, and accountability (Ward et al., 2009; Godlewski, 2006). Additionally, scrutiny has focused on the influence of corporate governance reforms and regulations on default risk (Jackson & Moerke, 2005). Improved corporate governance practices and regulatory frameworks contribute to lower default probabilities

by enhancing risk management, transparency, and accountability. Furthermore, recent literature has extensively investigated the synergy of corporate governance and accounting variables in enhancing the predictive power of bankruptcy models (Dallocchio, Ferri, et al., 2022). The combination significantly elevates bankruptcy model predictability.

5.5. Family firm

The relationship between family firms and the probability of default has been the subject of extensive investigation in the literature, as these firms constitute a significant portion of the global economy. Research in this domain has aimed to shed light on the unique characteristics of family firms that may influence their default risk.

Empirical findings yield a nuanced stance on family firms' association with default probability. Some studies suggest a lower default probability for family firms due to their long-term outlook, reputation preservation, and cautious financial approaches. Strong family values, loyalty, and unity contribute to enhanced resilience and risk management, decreasing default likelihood (Mitter et al., 2022; Abinzano et al., 2021). Conversely, other research contends that family firms might confront heightened default risk. Intra-family conflicts, succession challenges, and restricted external financing access can render family firms more vulnerable, potentially elevating default likelihood (Dallocchio, Caputo, et al., 2022; Mitter et al., 2022). The size of the family firm is also studied in relation to default risk. Larger family firms benefit from economies of scale, diversification, and robust governance, potentially lowering default probability. Conversely, smaller family firms contend with resource limitations, constrained capital access, and heightened shock susceptibility, increasing default risk (Wilson et al., 2013). Generational involvement's influence on default probability in family firms is another focal point. Research indicates that longer family engagement across generations is associated with reduced default risk, leveraging accumulated knowledge, experience, and reputation (Tilba & McNulty, 2013; Chua et al., 2011).

5.6. Ownership

Studies in this domain have investigated various dimensions of ownership and their implications for default risk.

Empirical findings indicate that heightened concentrated ownership relates to diminished default probability. Concentrated ownership aligns major shareholders' interests with the firm's, fostering commitment, monitoring, and risk management, ultimately decreasing default risk (Cao et al., 2015; Zeitun & Tian, 2007). However, research also underscores risks tied to excessive ownership concentration. When a few dominant shareholders hold extensive ownership, agency conflicts can arise, leading to self-serving behaviors, inadequate monitoring, and elevated default risk (Lubatkin et al., 2003). The role of institutional ownership's impact on default probabilities has also been explored. Institutional investors, like pension funds and mutual funds, often exhibit expertise, resources, and incentives for active monitoring,

enhancing risk management, and lowering default probability (Wang et al., 2015; Pukthuanthong et al., 2017). Foreign ownership's influence on default risk has been investigated, with potential benefits including global market access, technology transfer, and enhanced governance practices, thereby positively affecting default probabilities (Zeitun & Tian, 2007). Ownership stability's role in default risk has also been studied. Stable ownership structures, marked by lasting shareholders and limited turnover, bolster continuity, strategic decision-making, and risk management, ultimately reducing default probability. The interplay of ownership structure and default risk across different firm sizes has also been explored (Chiang et al., 2013; Zeitun & Tian, 2007). Ownership concentration, institutional ownership, and insider ownership's impact on default probabilities may fluctuate based on firm size, with varying ownership structures leading to distinct default risk implications.

5.7. Board attributes

The relationship between board attributes and the probability of default has been the subject of extensive research, highlighting the critical role of board composition in shaping firm outcomes.

Studies suggest that having independent directors on the board correlates with diminished default probability. Independent directors contribute objectivity, impartiality, and expertise to board discussions, fostering effective oversight, risk management, and strategic decision-making, leading to lower default risk (Fich & Slezak, 2008). Board size's association with default probabilities has also been investigated (Dallocchio, Ferri, et al., 2022) with variable outcomes (Switzer & Wang, 2013). Smaller boards can enhance decision-making efficiency, communication, and coordination, potentially leading to better risk management and reduced default likelihood, though the results hinge on firm complexity (Darrat et al., 2014). Furthermore, research delves into board tenure's impact on default probabilities (De Maere et al., 2014). Balanced inclusion of both long-tenured and fresh perspectives benefits the board, as experienced directors contribute institutional memory, while new members provide innovative insights and challenge groupthink, ultimately mitigating default risk (Lajili & Zeghal, 2017). The relationship between board leadership structure and default probabilities is another explored aspect. Separating CEO and board chair roles, or having a lead independent director, enhances board effectiveness, independence, and oversight, thereby curbing default risk (De Maere et al., 2014). Additionally, the interplay between board characteristics and default risk hinges on the firm's ownership structure. Board attribute influence may vary based on ownership concentration, with distinct governance dynamics leading to diverse default risk implications (Switzer et al., 2018; Fich & Slezak, 2008).

6. CONCLUSION

The findings of this literature review suggest that effective governance mechanisms, including board attributes, ownership structure, executive compensation, shareholder rights, disclosure

practices, and external governance mechanisms, play a crucial role in shaping default risk.

Empirical studies have demonstrated the importance of independent boards, diverse board compositions, and effective board committees in reducing default probabilities. Ownership structures that align the interests of shareholders with those of the firm have also shown associations with lower default risk. Furthermore, executive compensation practices that incentivize risk management and long-term value creation can contribute to mitigating default risk. Additionally, the protection of shareholder rights, the presence of robust regulatory frameworks, and the effectiveness of external governance mechanisms have been identified as key factors in reducing default risk. Sound regulatory oversight and market discipline contribute to a healthier governance environment, fostering lower default probabilities.

Moreover, the relationship between corporate governance and the probability of default holds important implications for managers, the state, and regulators. For managers, the findings of this literature review underscore the significance of implementing robust corporate governance practices to mitigate default risk. By fostering transparent and accountable decision-making processes, managers can enhance risk management, strengthen internal controls, and improve the overall financial health of their organizations. This can help protect the long-term viability and reputation of the firm, ensuring its sustainability in the face of potential financial distress.

The state and regulators play a crucial role in establishing and enforcing effective governance frameworks. The insights from this review highlight the importance of developing and maintaining regulatory frameworks that promote sound corporate governance practices. Regulators can consider implementing policies that encourage independent and diverse board compositions, enhance shareholder rights, and promote transparency and disclosure practices. By doing so, they can contribute to reducing the probability of default at the firm level, as well as strengthening the overall stability and resilience of the financial system. Furthermore, by identifying the key governance mechanisms that impact default risk, regulators can focus their attention on assessing the effectiveness of these mechanisms in regulated entities. This can help them identify potential areas of improvement and take appropriate actions to mitigate default risk and protect the interests of stakeholders.

Our comprehensive analyses have uncovered several promising avenues for future research, which will contribute to a deeper understanding of the interplay between corporate governance and the probability of default within the context of the identified thematic clusters as shown in the next table.

Table 8. Future research agenda

Topic	Future research theme 1	Future research theme 2	Future research theme 3
Auditor	Assessing the effectiveness of regulatory oversight	Incorporating machine learning techniques	Examining the impact of technological advancements
CEO	CEO succession planning and default risk	CEO turnover and default risk	technological disruptions and CEO leadership
Board diversity	Dimensions of board diversity	Stakeholder perspectives	Dynamic decision-making and risk management
Corporate governance	Incorporating machine learning techniques	Comparative analysis across jurisdictions	Regulatory frameworks and default risk
Family firm	Family firm culture	Family firm networks	Family firm success factors and default risk
Ownership	Ownership changes and default risk	Ownership stability and default risk	Ownership and financial distress warning signals
Board attributes	Board interlocks and default risk	Comparative analysis across jurisdictions	Board monitoring mechanisms and default risk

First and foremost, there is ample room for expanding existing research areas and exploring novel topics concerning the diverse forms and archetypes of contemporary governance models that have emerged in recent years. Additionally, it is imperative to empirically test the integration of various corporate governance variables with recently developed machine-learning techniques in order to enhance the impact of CG variables on these models. Furthermore, future studies should expand our systematic knowledge about the correlation of all together identified clusters, since they are typically studied separately without the possibility of developing a global comprehension.

Lastly, to advance our understanding, future studies should extend beyond the bibliometric investigation conducted in this study and systematically delve into the identified thematic clusters, giving careful consideration to the most influential articles within those clusters. Such efforts will undoubtedly contribute to the advancement of knowledge in this domain and provide valuable insights for practitioners and researchers alike.

While this review provides valuable insights into the relationship between corporate governance and default risk, it is important to acknowledge its limitations. Firstly, the review primarily focused on the existing literature and empirical studies, which may have limitations in terms of sample size, data quality, and generalizability. Future research could consider employing larger and more diverse samples to enhance the robustness of the findings, especially for small and medium-sized companies that have not been in-depth studied by previous research.

Furthermore, the review mainly concentrated on the firm-level perspective, neglecting the potential influence of macroeconomic factors and systemic risks on default probabilities. Investigating the interplay between corporate governance, macroeconomic conditions, and default risk would provide a more comprehensive understanding of the phenomenon.

Lastly, the review focused on traditional corporate governance mechanisms, but emerging areas such as ESG (environmental, social, and

governance) factors and sustainability practices warrant further investigation. Exploring the impact of ESG-related governance practices on default risk can provide valuable insights into the evolving landscape of corporate governance and its implications for financial stability.

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