



The Nexus Between ESG Integration and Capital Structure in Banks: A Systematic Review of Determinants and Mechanisms

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Abstract

This study aims to answer the question of how ESG integration affects the determinants of a bank's capital structure, considering that the systematic understanding of this nexus remains fragmented in the literature. This study employs a Systematic Literature Review conducted following the PRISMA 2020 guidelines by searching the Scopus database, yielding 298 documents. After gradual screening, 84 high-quality studies published between 2013 and 2024 were analyzed using a narrative synthesis approach. The findings suggest that ESG appears increasingly important as an emerging determinant of a bank's capital structure, with 65.5% of studies identifying ESG as a notable factor associated with shifts in the role of profitability relative to traditional determinants. Four mechanisms were identified: adjustment effects that affect the relative importance of traditional determinants, mediation mechanisms through financial performance and risk profiles, conditional effects based on firm-level and market-level contexts, and temporal effects suggesting increasing relevance observed since 2020. Relationship patterns showed that 53.8% of studies identified positive associations between ESG and leverage capacity, 23.1% negative associations, and 15.4% conditional effects. The temporal distribution reveals that 65.5% of studies were published in 2022–2024, indicating a notable increase in scholarly attention in this field. The findings contribute to ongoing efforts to incorporate ESG dimensions into capital structure theory and carry practical implications for bank management in capital planning, investors in evaluating sustainability strategies, and policymakers in designing prudential regulations that account for ESG considerations.

Keywords: ESG integration; Capital Structure; Bank.

1 Introduction

Environmental, Social, and Governance (ESG) integration has transformed from a voluntary corporate initiative to a strategic imperative in global financial institutions (Gillan et al., 2021). The banking sector is facing increasing pressure from stakeholders to adopt sustainability practices, which are reinforced by regulatory frameworks such as the European Union's

Sustainable Finance Disclosure Regulation and climate-related financial risk guidelines from the Basel Committee (D'Orazio & Popoyan, 2019; Schoenmaker & Schramade, 2019). Capital structure decisions are a strategic choice that has a significant impact on banking institutions, with implications for risk profiles, cost of capital, and regulatory compliance (DeAngelo & Stulz, 2015). Traditional theories state that optimal leverage is determined by the trade-off between tax benefits, bankruptcy costs, and information asymmetry, with determinants that include profitability, company size, growth opportunities, and risk profile (Berger et al., 2008; Harris & Raviv, 1991; MYERS, 1984). However, the contemporary banking environment with increasing awareness of ESG has the potential to change the hierarchy of these traditional determinants. Growing research shows that ESG integration can transform the determinants of capital structure through a variety of channels, including the reduction of information asymmetry and capital costs (El Ghouli et al., 2011), increased stakeholder trust (Cheng et al., 2014), the creation of alternative financing instruments such as green bonds (Flammer, 2021), as well as the integration of ESG factors in prudential frameworks (NGFS, 2020).

Although research on Environmental, Social, and Governance (ESG) and capital structures is growing rapidly, the existing literature still has some fundamental limitations. First, most studies address ESG and capital structure separately so the relationship between the two has not been explicitly analyzed (Busch & Hoffmann, 2011). Second, differences in methodological approaches and ESG measurement result in diverse findings that are difficult to synthesize (Drempetic et al., 2020). Third, post-COVID-19 pandemic developments suggest that previous findings may not fully reflect current dynamics (Albuquerque et al., 2020). Fourth, the theoretical framework is still not sufficiently developed (Eccles et al., 2021). Fifth, the geographical concentration of the study limits the generalization of the findings (Amel-Zadeh & Serafeim, 2018). Sixth, there has not been a comprehensive systematic literature review that synthesizes evidence on the relationship between ESG and capital structure in banking institutions. This geographical gap deserves special attention. As far as can be identified from the available literature, there is still very little empirical evidence coming from the developing ASEAN banking system, including Indonesia. The majority of studies included in this review were based in Europe (8.3%), North America (14.6%), or global/multi-region (10.4%), while the Southeast Asian context was almost not explicitly represented. In fact, the ASEAN banking system has different institutional characteristics, such as evolving ESG regulations, the dominance of state-owned banks, and different investor orientations compared to developed countries. In Indonesia, although the Financial Services Authority (OJK) has published the Sustainable Finance Roadmap and Indonesia's Green Taxonomy, research specifically analyzing the relationship between ESG integration and bank capital structure is still lacking. This condition shows that the generalization of findings from developed countries to the ASEAN context needs to be done carefully. Based on these conditions, this study seeks to fill the literature gap through systematic literature review to identify the patterns of relationships, influence mechanisms, and research developments regarding ESG integration and bank capital structure.

Based on the research gap, the main question in this study is How does ESG integration affect the determinants of a bank's capital structure? The questions of this study specifically include: (1) What determinants of capital structure are identified in the context of ESG integration? (2) What is the direction and strength of the relationship between ESG and capital structure? (3) Through what mechanisms does ESG influence capital structure decisions? (4) What contextual factors moderate the relationship? and (5) How the development of understanding of ESG relationships and capital structures evolved during the period 2013–2024. This study aims to synthesize empirical evidence on the influence of ESG integration on the determinants of capital structure through the process of systematic identification, evaluation, and synthesis of literature. In particular, this study aims to identify the determinant hierarchy of capital structure in the context of ESG integration, analyze the direction and conditions of the relationship between ESG and capital structure, identify the mechanisms and pathways of ESG influence, evaluate the contextual

factors that moderate these relationships, and analyze the evolution of research developments during the period 2013–2024. This research makes a theoretical contribution by providing an empirical foundation for the development of ESG-augmented capital structure theory and deepening understanding of the causal dynamics between ESG integration and bank capital structure. From a practical perspective, this research offers applicative insights for bank managers in capital structure planning, for investors in evaluating corporate sustainability strategies, and for policymakers in designing regulations that are relevant and adaptive to sustainable financial practices. In addition, this study also identifies various research gaps and proposes a comprehensive research agenda to support the development of sustainable banking finance in the future.

This study is one of the few systematic literature reviews that comprehensively synthesizes evidence on the link between ESG integration and capital structure determinants in the context of banking. Using the rigorous PRISMA 2020 guidelines, this study systematically identifies, evaluates, and synthesizes existing evidence to uncover patterns, mechanisms, and contextual factors (Page et al., 2021). The novelty of the research includes the identification of determinant hierarchies in the ESG-integrated banking environment, the mapping of various ESG influence pathways including the effects of mediation and signaling mechanisms, as well as temporal analysis for the period 2013–2024 that captures the post-pandemic paradigm shift.

2 Literature Review

This study uses four complementary theoretical perspectives to explain the relationship between ESG integration and capital structure in banking institutions. Trade-off theory and pecking order theory are used as the main foundation for understanding capital structure decisions, while stakeholder theory and signaling theory serve as supporting theories that explain how ESG factors affect market perception and banks' relationships with stakeholders. From a trade-off theory perspective, ESG integration is seen as able to change the optimal balance of capital structure through reduced risk and capital costs. Banks with better ESG performance tend to have a lower risk of bankruptcy and financial vulnerability, thus increasing leverage capacity and financial stability (Gangwani & Kashiramka, 2024; Khan et al., 2024). Thus, ESG is no longer positioned as an additional factor, but is part of strategic considerations in determining the optimal capital structure. Meanwhile, pecking order theory explains that ESG disclosure can reduce information asymmetry between banks and fund providers. ESG transparency and sustainability reporting improve the quality of corporate information thereby expanding access to external funding at a lower cost (Zahid et al., 2024). In this context, ESG serves as an information instrument that influences the preferences of banks' funding sources.

This relationship is further strengthened by stakeholder theory that emphasizes the importance of stakeholder pressures and expectations on the company's sustainability practices. ESG integration allows banks to gain legitimacy, increase investor confidence, and expand access to sustainable financing sources (Chiaramonte et al., 2024). On the other hand, signaling theory explains that ESG disclosure is a positive signal for the market regarding the quality of governance, stability, and long-term prospects of the company. These signals can reduce risk perception and increase the trust of creditors and investors in banks (Bamahros et al., 2022; Yu et al., 2024). The four theories form an integrated conceptual framework in explaining the nexus between ESG and capital structure. Trade-off theory and pecking order theory explain the core mechanisms of funding decisions, while stakeholder theory and signaling theory reinforce explanations of how ESG affects market perception, funding access, and stakeholder responses. Thus, ESG integration can be understood as a strategic factor that reconfigures the traditional determinants of capital structure in the context of modern banking.

3 Research Methods

This study is a systematic literature review that follows the guidelines of PRISMA 2020 to ensure transparency and reproducibility. The research questions were developed using the PEO (Population, Exposure, Outcome) framework. The populations in this study include commercial banks, investment banks, and universal banks; exposure in the form of ESG integration practices or ratings; and outcomes in the form of determinants of capital structure which include leverage ratio, debt-equity ratio, and capital structure decisions. The research question formulated was: "How does ESG integration affect the determinants of a bank's capital structure?"

Data Search Strategy The research data consists of scientific articles that have gone through peer-reviewed obtained through a systematic search on the Scopus database on December 8, 2024. The use of only one database, namely Scopus, is a limitation in this study because it has the potential to cause publication bias and miss relevant articles that are only indexed in other databases such as Web of Science or Dimensions. Nevertheless, the selection of Scopus can still support the quality of this literature review because the database has a wide multidisciplinary scope, a high reputation in indexing leading journals (especially in the fields of business, economics, management, finance, environment, and social sciences), and provides reliable and transparent systematic search features. By using Scopus as the only source, this research is still able to produce a credible and relevant synthesis of literature, as long as the search is carried out systematically, well-documented, and the inclusion and exclusion criteria are strictly applied. However, the results of this literature review cannot be claimed to be a complete representation of all existing literature. Further research is recommended to extend the search to multiple databases to increase coverage and reduce the risk of selection bias.

The search string is composed of four main concepts that are associated with the Boolean AND operator, namely: Bank concept (bank, banking institution, financial institution, commercial bank, investment bank, universal bank, banking sector); ESG integration concept (ESG, environmental social governance, sustainability, CSR, sustainable finance, green banking, ESG performance, ESG practices, ESG ratings, ESG disclosure); The concept of capital structure (capital structure, leverage, debt-equity ratio, capital adequacy, debt ratio, financing decisions, capital composition); Determinant concepts (determinant, factor, driver, influence, predictor, impact, effect, relationship).

The search is performed on the TITLE-ABS-KEY field using a combination of Boolean and wildcard operators. The search string used is: TITLE-ABS-KEY ((bank OR banks OR "banking institution*" OR "financial institution*" OR "commercial bank*" OR "investment bank*" OR "universal bank*" OR "banking sector" OR "banking industry" OR "credit institution*" OR "depository institution*") AND (ESG OR "environmental social governance" OR "environmental social and governance" OR sustainability OR sustainable OR "corporate social responsibility" OR CSR OR "sustainable finance" OR "green banking" OR "green finance" OR "responsible banking" OR "ethical banking" OR "ESG performance" OR "ESG practice*" OR "ESG rating*" OR "ESG score*" OR "ESG disclosure" OR "ESG reporting" OR "ESG integration" OR "environmental performance" OR "social performance" OR "governance performance" OR "triple bottom line" OR "socially responsible") AND ("capital structure" OR "financial structure" OR leverage OR "financial leverage" OR "debt-equity ratio" OR "debt equity ratio" OR "capital adequacy" OR capitalization OR "debt ratio" OR "equity ratio" OR "debt level" OR "leverage ratio" OR "capital decision*" OR "financing decision*" OR "debt financing" OR "equity financing" OR "capital composition" OR "financial policy" OR gearing OR "debt policy" OR "liability structure") AND (determinant* OR factor* OR driver* OR antecedent* OR influence* OR predictor* OR impact OR effect* OR relationship)) AND (LIMIT-TO (OA ,

"all")). The search was limited to open access articles, English, publication period 2010–2024, as well as document types of articles and review articles.

Data Extraction The extracted data includes bibliometric information (author, year, title, journal, country), study characteristics (research design, methodology, sample size, analysis techniques), ESG measures (dimensions, indicators, data sources), capital structure variables (leverage ratio, debt-to-equity ratio, capital decisions), determinants examined (both traditional and ESG-related), as well as key findings regarding the direction, magnitude, and significance of the relationship between ESG and capital structure. **Population Inclusion and Exclusion Criteria** The study is a peer-reviewed academic article that discusses the relationship between ESG integration and capital structure in the context of banking, published in the period 2010–2024 in English. Inclusion criteria include articles that explicitly discuss ESG-capital structure relationships in banking institutions, analyze the determinants of capital structure in the context of ESG, or explore mediation mechanisms. The types of documents that are eligible are original articles and review articles with a rigorous peer review process. In contrast, conference papers, book chapters, working papers, dissertations, and editorial materials were excluded from the research. The study population should focus on commercial banks, investment banks, or universal banks, excluding non-financial companies, microfinance institutions, or central banks.

The determination of the sample was carried out through a gradual selection process according to the PRISMA flowchart. Of the 298 data identified, initial screening by year of publication (2010–2024), language (English), and document type resulted in 202 data. Screening of titles and abstracts by two independent reviewers excluded 14 data, leaving 188 data for full-text assessment. Full-text screening then excluded 72 articles citing limited access to the full text (32 articles), inadequate ESG-capital structure analysis, irrelevant population, or poor methodology, resulting in 116 articles for quality assessment. Article quality assessment is carried out using the Modified Mixed Methods Appraisal Tool (MMAT) which has been adapted for the needs of systematic literature review in the financial sector. Each article was evaluated based on five main criteria, namely: (1) the clarity of the research question, (2) the suitability of the methodology with the research question, (3) the accuracy and rigor of the data analysis, (4) the clarity of the reporting of the research findings, and (5) the relevance of the article to the research question in this literature review. Each criterion is assigned a binary score (0 or 1), so the maximum score that each article can obtain is 5. Articles with a total score of 1–2 are categorized as low quality and excluded from the analysis, articles with a score of 3 are categorized as moderate quality, while articles with a score of 4–5 are categorized as high quality and included in the synthesis process.

The assessment process was carried out independently by two reviewers using standardized assessment sheets that were pilot-tested on 10 articles before full implementation. After the independent assessment process is completed, the level of agreement between reviewers is measured using the Cohen's Kappa coefficient to ensure the reliability of the assessment. Differences in assessment results are resolved through structured discussions until consensus is reached. If consensus cannot be reached, the article is referred to a third reviewer as a tiebreaker. Of the total 116 articles evaluated, 32 articles were excluded because they obtained low quality scores or had significant methodological problems, such as methodological unclearness, inadequate data analysis, or lack of transparency in reporting research results. Thus, the selection process resulted in 84 high-quality articles that were used in the data extraction and synthesis stages.

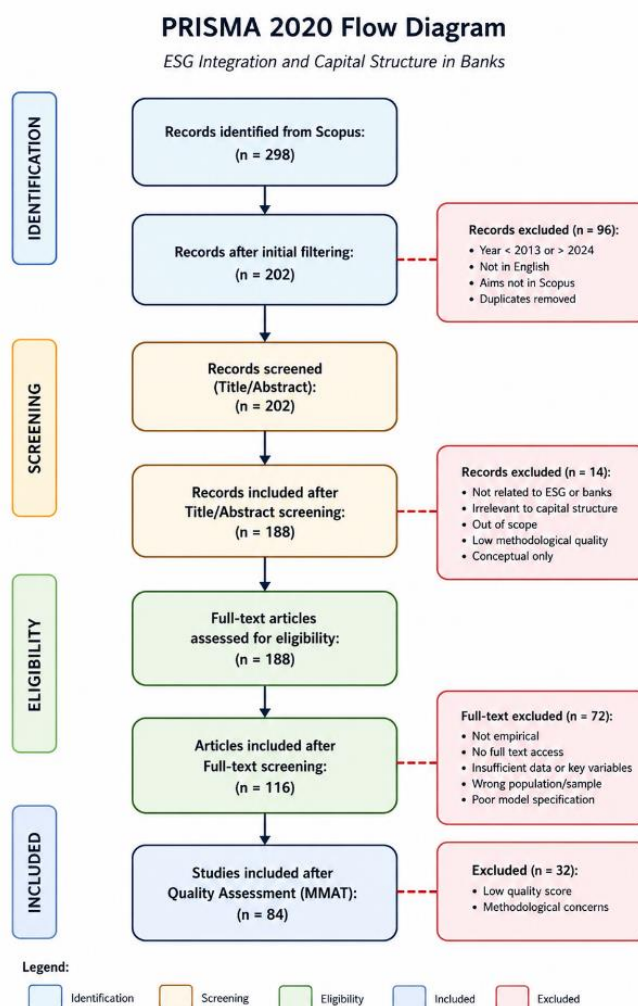
The analysis in this study uses a narrative synthesis approach because of the high heterogeneity between studies, both in terms of methodology, ESG measurement, and research context, so that quantitative meta-analysis is not possible. The synthesis process begins with a descriptive analysis of the study characteristics which includes publication trends, geographical distribution, research

methods, and sample characteristics to provide an overview of the development of the literature. Furthermore, thematic analysis is carried out through three stages of coding, namely open coding, axial coding, and selective coding. In the open coding stage, each article is examined to identify concepts that are relevant to the research question. The axial coding stage is used to group codes that have conceptual similarities into broader categories through the constant comparison method. Furthermore, at the selective coding stage, these categories are integrated into the main themes that represent the dominant patterns in the literature. The coding process was carried out independently by two researchers with periodic calibration sessions to maintain consistency of interpretation. The results resulted in seven main themes, namely sustainability practices, ESG and financial performance, ESG performance and leverage, governance structure, regulatory environment, risk management, and bank stability.

Determinant analysis was conducted to identify and categorize the determinants of capital structure affected by ESG integration, with a division into traditional determinants (profitability, size, growth, risk) versus emerging ESG-related determinants. The relationship pattern analysis identifies the direction and magnitude of the ESG-capital structure relationship, which is categorized as positive, negative, mixed/conditional, or non-linear. The mechanism analysis identifies pathways in which ESG affects capital structures, including mediation effects, signaling mechanisms, stakeholder pressures, and moderation effects. Temporal analysis was conducted to track the evolution of the research focus during the period 2013–2024. The synthesis matrix is structured to systematically organize findings across studies to facilitate the identification of convergent and divergent patterns. The quality assessment of the synthesized evidence uses a GRADE-like approach by considering the distribution of study quality, consistency of findings, and directness of evidence.

The identification stage yielded 298 data from Scopus, with the initial screening excluding 96 data leaving 202 data for further screening. The screening stage excludes 14 data, resulting in 188 data for the feasibility assessment. The feasibility stage excludes 72 articles, leaving 116 articles for quality assessment. Finally, the quality assessment stage excluded 32 articles, resulting in a final inclusion of 84 high-quality studies for data extraction and synthesis. The PRISMA flowchart serves as a visual representation that facilitates an understanding of the scope, process, and acuity of this systematic literature review, while ensuring a systematic, rigorous, and transparent approach to identifying, selecting, and synthesizing relevant evidence.

The research framework is visualized through the PRISMA 2020 Flowchart in Figure 1 which describes the systematic process from the identification stage to the inclusion of the study.



Source: PRISMA 2020
Figure 1. Prism Groove

4 Results and Discussion

A systematic search of the Scopus database using a comprehensive search string resulted in 298 documents identified as of December 8, 2024. After the initial screening was carried out based on the criteria of the year of publication (2010–2024), language (English), and document type (journal articles and review articles), a total of 202 documents were retained for the next screening stage. A title and abstract screening process was carried out to assess the relevance of the topic, resulting in 188 articles that met the pre-established inclusion and exclusion criteria. A total of 14 articles were excluded at this stage because they did not show an explicit link between ESG integration with capital structures, focused on non-banking institutions, or were conceptual without empirical analysis.

The eligibility level involves a full-text assessment of 188 articles that passed the screening. At this stage, 72 articles were excluded for a variety of methodological and substantive reasons, including inaccessible full text (despite being recorded as open access), inadequate ESG analysis, focus on the wrong population (microfinance institutions or central banks), and poor methodological quality. This process resulted in 116 articles which were then assessed for quality using the Modified MMAT (Mixed Methods Appraisal Tool). The quality assessment excluded 32 additional articles that had low quality scores or significant methodological issues, resulting

in 84 final studies to be analyzed in the data synthesis. The entire selection process follows the PRISMA 2020 guidelines and is documented in the flowchart available in Figure 1.

The temporal distribution of the 84 included studies showed a significant growth pattern in the last five years. A total of 65.5% of the total studies were published in the period 2022 to 2024, with an increasing trend that began to be seen since 2020. The number of publications in 2023 experienced a fairly sharp jump compared to previous years, followed by growth that remained high in 2024. This pattern indicates that the linkage between ESG integration and capital structure in the banking sector is an emerging research area and is accelerating rapidly, especially after the COVID-19 pandemic.

The geographical distribution of the study shows a fairly wide diversity of contexts. Studies focusing on North America accounted for 14.6% of the total studies, followed by Asia (10.4%), as well as global or cross-regional studies (10.4%). Europe accounted for 8.3% of the total studies, while the Middle East and Africa regions contributed 6.2% each. This diversity of geographical representations allows for the synthesis of findings that can be applied to different regulatory environments, levels of market development, as well as different cultural contexts. The complete characteristics of the included studies are presented in Table 1.

Table 1. Characteristics of Included Studies (N=84)

Characteristics	n	%
Publication Period		
2013-2019	12	14.3
2020-2021	17	20.2
2022-2024	55	65.5
Geographic Distribution		
North America	12	14.6
Asia	9	10.4
Global/Multi-region	9	10.4
Europe	7	8.3
Middle East	5	6.2
Africa	5	6.2
Others	37	40.1
Research Methods		
Quantitative Empirical	73	87.0
Qualitative	7	8.3
Systematic review	1	1.2
Mixed methods	3	3.5

From a methodological perspective, the majority of studies adopted an empirical quantitative approach (87.0%), with panel data regression and OLS regression as the most dominant analysis techniques. As many as 42.2% of the study used quantitative panel data or regression analysis, while 5.2% used quantitative surveys. Qualitative studies account for 8.3% of the total, which generally explore the mechanisms and processes of ESG implementation in capital decisions. The characteristics of the reported sample showed substantial variation, with an average of 79 banks per study (median 33 banks, range 17–628 banks), reflecting the diversity of the scale of analysis from intensive case studies to large-scale cross-country comparisons.

Thematic Synthesis

Thematic analysis of the 84 included studies identified seven key interrelated themes. Sustainability practices emerged as the dominant theme with 59 studies (70.2%) exploring how sustainability practices influence capital structure decisions in banks. This theme includes green banking initiatives, sustainable finance practices, environmental risk management, and the integration of sustainability principles in corporate strategies. Findings consistently show that banks with strong sustainability practices tend to have better access to sustainable financing sources as well as be able to obtain more favorable terms in the debt market.

The second theme that stood out was the relationship between ESG and financial performance, with 28 studies (33.3%) analyzing the linkage between ESG performance and financial outcomes that indirectly influenced capital structure decisions. These studies show that superior ESG performance contributes to sustainable profitability, better risk-adjusted returns, and increased stakeholder confidence. These factors further support optimal capital structure decision-making through a reduction in the cost of capital and an increase in debt capacity.

A complete distribution of the identified themes is presented in Table 2.

Table 2. Thematic Distribution of Studies (N=84)

Theme	n	%	Key Focus
Sustainability Practices	59	70,2	Implementation of sustainability practices in bank operations
ESG & Financial Performance	28	33,3	The relationship between ESG and financial performance
ESG Performance & Leverage	19	22,6	The direct relationship between ESG and leverage decisions
Governance Structure	16	19,0	Corporate governance mechanisms in ESG integration
Regulatory Environment	8	9,5	Regulatory framework that mediates ESG relationships and capital structure
Risk Management	8	9,5	ESG as a risk mitigation strategy
Bank Stability	3	3,6	The impact of ESG on banking stability

The ESG performance and leverage theme, which explicitly analyzes the direct relationship between ESG performance and leverage decisions, was identified in 19 studies (22.6%). The findings in this theme show that there is heterogeneity both in terms of direction and strength of the relationship. Some studies found positive associations, while others identified negative or conditional associations. The theme of governance structure as an independent theme emerged in 16 studies (19.0%), which emphasized the importance of corporate governance mechanisms as a fundamental determinant in ESG integration, which further influences capital structure. Meanwhile, the regulatory environment and risk management were analyzed in 8 studies (9.5%), respectively, reflecting the increasing recognition of the role of regulatory frameworks and risk considerations in the relationship between ESG and capital structure.

Synthesis of Key Studies: A Review of Representative Studies

To provide a more concrete picture of the research landscape analyzed, Table 3 presents ten representative studies selected based on thematic relevance, diversity of geographical contexts and methodological contributions to understanding the relationship between ESG integration and banking capital structure. These studies cover regions ranging from Europe, North America, BRICS emerging markets to one ASEAN-based study and use a wide range of ESG proxies and capital structure proxies. Special attention was paid to the study (Suttipun et al., 2025) Thailand-based one, although it does not explicitly analyse capital structure decisions, is one of the very few studies in this sample that provide evidence from the ASEAN banking context.

Table 3. Synthesis of Representative Studies: ESG Integration and Capital Structure in Banking

Author (Year)	Country/Region	Sample	ESG Proxy	Capital Structure Proxy	Key Findings
Khan et al. (2024)	Europe	312 listed banks, 2015-2022	Bloomberg ESG score	Debt-to- equity ratio; Leverage Ratio	Higher ESG scores associated with increased debt capacity; governance dimension shows strongest association with leverage
Gangwani & Kashiramka (2024)	Emerging markets (India, China, Brazil)	156 commercial banks, 2012-2021	MSCI ESG rating	Capital adequacy ratio; Leverage Ratio	ESG performance negatively associated with risk-taking; Social dimension most influential on capital structure in emerging markets
Chiaramonte et al. (2024)	Europe	207 banks, 2005-2019	Refinitiv ESG combined score	Tier 1 capital ratio; Debt Ratio	Environmental policies positively associated with bank financial stability; effect more pronounced during crisis periods
Zahid et al. (2024)	China	89 listed banks, 2010-2022	ESG disclosure index (CSMAR)	Leverage ratio; debt- to-assets ratio	ESG disclosure negatively associated with leverage; audit quality moderates this relationship, strengthening it for high-quality auditors

Bagh et al. (2024)	USA & China	240 firms incl. banks, 2013-2022	Refinitiv ESG score	Debt ratio; Capital Structure Index	ESG investment positively affects firm value under real-option framework; Effect Conditional on Market Development Level
Chiaramonte et al. (2021)	Europe	176 banks, 2005-2017	Asset4 ESG score (Thomson Reuters)	Z-score (stability proxy); Leverage Ratio	Higher ESG scores correlated with reduced bank fragility during financial turmoil; governance component most relevant for capital decisions
El Ghoul et al. (2011)	USA	2,809 firm-year obs., 1992-2007	KLD CSR score	Cost of equity; implied cost of capital	CSR/ESG performance negatively associated with cost of equity, implying expanded debt capacity for high-ESG firms
Flammer (2021)	Global	285 Green Bond Issuances, 2013-2018	Green bond issuance (ESG proxy)	Debt composition; Green debt ratio	Green bond issuance associated with improved financial performance and stock returns; signals ESG commitment to capital markets
Yu et al. (2024)	BRICS (Brazil, Russia, India, China, S. Africa)	420 firms incl. banks, 2010-2021	Refinitiv ESG combined score	Investment mix; debt-equity ratio	ESG performance positively influences investment mix toward sustainable assets; effect varies by institutional environment
Sutti et al. (2025)	Thailand (ASEAN)	160 listed companies, 2019-2023	ESG disclosure score (SET)	Market reaction (price); implied capital cost	ESG disclosure positively associated with market reaction; provides limited direct evidence on capital structure decisions in ASEAN context

Source: Synthesis results of 84 included studies (2013-2024)

Of the ten studies presented, a consistent pattern was seen: the majority of studies based in the European region and developed countries used ESG proxies from large commercial data providers such as Refinitiv, Bloomberg and MSCI and reported a positive relationship between ESG scores and leverage capacity or financial stability. In contrast, studies from emerging markets including India, China, Brazil, and Thailand show more nuanced, with more conditional effects on regulatory environmental factors and the level of market development. Furthermore, almost none of the studies in this sample explicitly focused on the context of ASEAN and in particular Indonesia, which reinforces the identification of geographic research gaps revealed in the previous section.

ESG – Capital Structure Nexus: Key Findings

An analysis of the key findings of the 84 included studies shows that ESG integration has emerged as a key determinant in capital structure decisions in modern banking. A total of 55 studies (65.5%) identified ESG factors as determinants that go beyond traditional factors focused on profitability. These findings represent a fundamental shift in the hierarchy of determining capital structure, where ESG considerations are no longer incremental, but rather a core factor in funding decision-making. Profitability, which traditionally dominates capital structure theory, was still identified in 33 studies (39.3%), but its role was increasingly moderated by ESG factors.

Governance quality was identified as an important determinant in 26 studies (31.0%), with an emphasis on its role in facilitating ESG implementation and influencing capital structure decisions through increased transparency and stakeholder trust. Growth opportunities, which emerged in 22 studies (26.2%), are now understood in terms of sustainable growth compared to conventional growth. ESG-aligned growth opportunities drive fundamentally different financing options. Meanwhile, the risk profiles analyzed in 13 studies (15.5%) showed that ESG integration can lower risk perceptions, which in turn affects the cost of capital through a decrease in risk premiums.

The pattern of relationship between ESG and capital structure shows a high level of complexity. Of the 84 studies included, only 13 explicitly measured the direction of the relationship.

Table 4. ESG-Capital Structure Relationship Pattern

Relationship Patterns	n	%	Main Mechanism
Positive (higher ESG → higher leverage)	7	53,8	Signaling mechanisms, decreasing information asymmetry, increasing debt capacity
Negative (higher ESG → lower leverage)	3	23,1	Stakeholder preferences, prudential motives, increased financial flexibility
Mixed/Conditional	2	15,4	Context-dependent: bank size, regulation, and level of market development
Nonlinear (U-shaped/threshold)	1	7,7	Threshold effects and diminished benefits at very high ESG levels

Among these studies, as many as 53.8% showed a positive relationship, where higher ESG performance was associated with increased leverage or debt capacity. Studies that find a positive relationship between ESG performance and capital structure generally explain these findings through the perspective of signaling theory. Banks with high ESG performance are considered able to reduce information asymmetry between companies and creditors. This condition increases creditors' confidence so that they are willing to provide access to greater debt financing at lower costs. This logic is in line with the modified pecking order theory, where ESG disclosure serves as a mechanism that lowers the cost of adverse selection in debt financing. Thus, debt is a relatively more attractive alternative funding than other sources of funding. These positive

findings are more prevalent in studies using samples from countries or regions with strong ESG regulations, such as the European Union and North America, where creditors and investors structurally respond to ESG signals delivered by companies.

In contrast, 23.1% of studies found negative relationships, where higher ESG performance was associated with lower leverage preferences. These findings are explained by stakeholder preferences as well as the existence of prudential motives to maintain financial flexibility. Studies that find negative associations offer equally strong arguments, but through different mechanisms. Banks with high ESG performance often face pressure from various stakeholders, especially ESG-oriented institutional investors, to maintain financial flexibility and avoid excessive levels of leverage. Debt levels that are too high are seen as potentially disrupting banks' ability to meet long-term sustainability commitments. From a trade-off theory perspective, banks internalize ESG-related reputation costs as part of financial distress costs, resulting in a lower optimal leverage level. The findings of this negative relationship are more often found in research in emerging markets, where ESG signals have not been fully integrated in the pricing mechanisms in the capital market. In this context, ESG implementation is often seen as an additional compliance cost that has not been offset by ease of access to debt financing.

A total of 15.4% of the study identified mixed or conditional effects, where the direction of the relationship between ESG and capital structure varied depending on contextual factors, such as bank size, level of tightening, stage of market development, and crisis conditions compared to normal periods. Nonlinear patterns were identified in 7.7% of studies, indicating the presence of U-shaped relationships or threshold effects, where ESG benefits on capital structures are non-linear and have the potential to diminish returns at very high ESG levels. The low proportion of studies that explicitly identified the direction of the relationship (13 out of 84 studies or 15.5%) indicates that the relationship between ESG and capital structure is often implicit or indirect. Many studies focus more on intermediary mechanisms as well as complex, multi-pathway relationships.

The most frequently analyzed capital structure measures included leverage ratios (9 studies; 10.7%), capital adequacy (7 studies; 8.3%), and general capital structure decisions (8 studies; 9.5%). Meanwhile, the debt level and equity ratio were only analyzed in 1 study (1.2%) respectively. In terms of ESG variables, sustainability practices are the most widely used indicator (25 studies; 29.8%), followed by corporate social responsibility (CSR) indicators (14 studies; 16.7%), environmental performance (9 studies; 10.7%), and social performance and governance respectively (4 studies; 4.8%). The comprehensive use of ESG scores or ratings was found in only 2 studies (2.4%), reflecting the heterogeneity of measurement approaches as well as challenges in standardization.

Meanwhile, studies that found the effects were conditional or mixed (mixed effects) provided the most comprehensive intellectual contribution. These findings show that the positive and negative relationship between ESG and capital structure is not a permanent dichotomy, but rather depends on the characteristics of the institutional environment in which the company operates. In tight regulatory regimes and emerging capital markets, higher ESG performance tends to correlate positively with leverage as ESG signals obtain a clear response from the market. In contrast, in markets that are less developed or have weak levels of regulatory enforcement, banks with high ESG performance may opt for lower levels of leverage as a precautionary measure. This happens because the market has not been able to translate ESG signals into a real reduction in the cost of capital. Therefore, the difference in the results of the study should not be seen as an inconsistency of the literature, but rather as evidence of the existence of certain conditions that determine which mechanism is more dominant in influencing capital structure decisions.

The low rate of identification of explicit links between ESG and capital structure—found in only 13 of the 84 studies reviewed (15.5%)—has important methodological implications. These findings show that most studies still analyze the two constructs separately, namely ESG as a determinant of financial performance or capital structure as a consequence of traditional financial factors, without directly examining the relationship between the two. From a theoretical perspective, this condition indicates that the available empirical evidence is not strong enough to conclude that ESG is a direct determinant of capital structure. On the other hand, the evidence suggests that ESG influences a number of intermediary variables, which in turn influence capital structure decisions. This distinction is important to avoid overclaiming and ensure that the conclusions produced remain within the bounds supported by the available empirical evidence.

Mechanisms and Pathways of Influence

Based on the synthesis of 84 studies in this systematic literature review, a conceptual framework of ESG-augmented capital structure theory was developed that integrates four main mechanisms through which ESG integration influences capital structure decisions in banking institutions. The conceptual framework of ESG-augmented capital structure theory developed from the synthesis of findings is presented in Figure 2.

Path 1: Reconfiguration Effect

The first path shows that ESG integration fundamentally reconfigures the hierarchy of determinants of traditional capital structures. Within this framework, ESG occupies a position as a key determinant that goes beyond conventional factors such as profitability. The new hierarchy of determinants includes: ESG integration as a key determinant, followed by ESG-moderated profitability, governance quality, and growth opportunities. This reconfiguration indicates that capital structure decisions in the era of sustainable banking can no longer be understood only through a financial perspective, but must integrate sustainability aspects as the main strategic factor.

Pathway 2: Mediation Mechanisms

The second track describes the indirect mechanisms through which ESG affects capital structures. ESG integration has been proven to improve financial performance as well as lower risk profiles, ultimately lowering the cost of capital. This reduction in capital costs increases financing capacity and facilitates more optimal capital structure decision-making. This pathway is important because it explains how sustainability practices translate into concrete financial benefits and have a direct impact on the financing options available to banks.

Pathway 3: Signaling Mechanisms

The third path departs from an information economy perspective, where ESG disclosure and transparency serve as credible quality signals to reduce information asymmetry between banks and capital providers. Strong ESG signals increase the confidence of creditors and investors, which is reflected in better access to capital markets, more favorable debt terms, as well as increased financing capacity. This mechanism is particularly relevant in the banking sector which has high information sensitivity and strong regulatory demands for transparency.

Track 4: Moderation Effects

The fourth track confirms that the relationship between ESG and capital structure is contextual and influenced by various moderation factors. At the enterprise level, factors such as bank size and ownership structure determine ESG investment capacity and sensitivity to stakeholder pressures. At the market level, the level of regulatory tightness and the stage of market development shape the institutional environment in which the relationship takes place. In addition, temporal factors such as crisis periods and regulatory changes also affect the strength and direction of the relationship. This pathway explains the heterogeneity of findings in the literature and affirms the importance of a contingency approach.

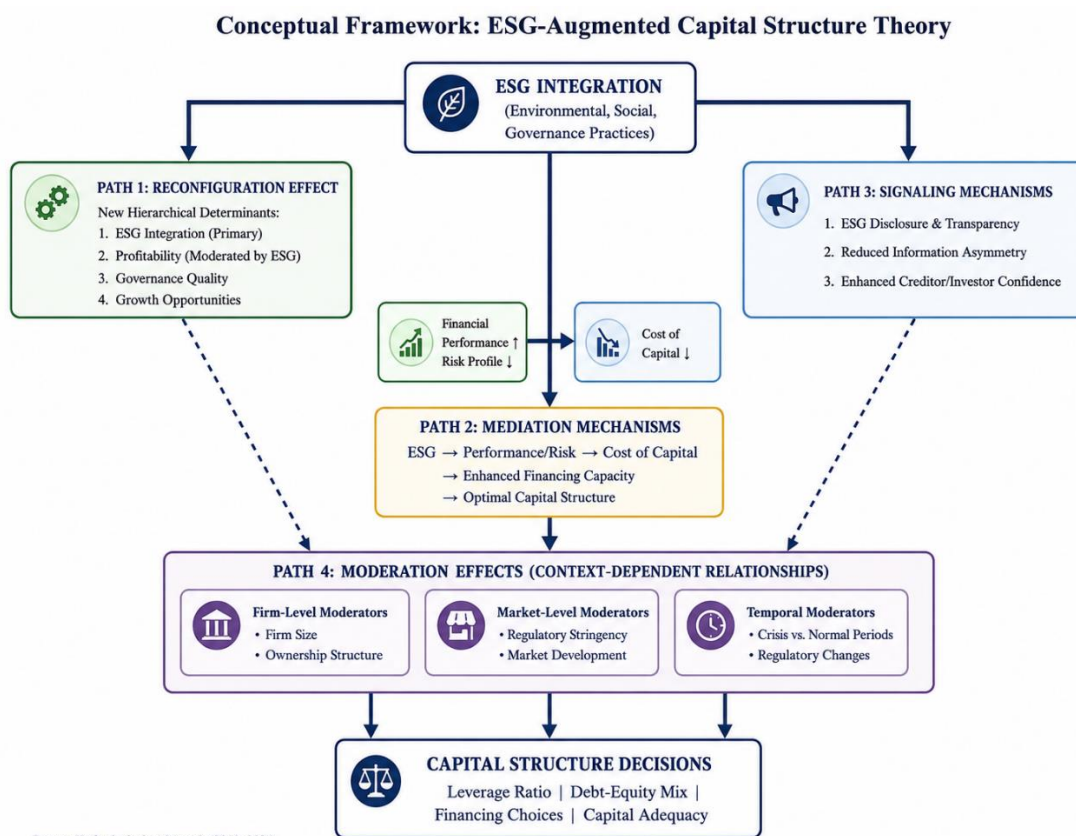


Figure 2. ESG-augmented capital structure theory Conceptual Framework

Integration and Convergence

The four paths do not work separately, but interact with each other and reinforce each other in shaping capital structure decisions. Solid arrows in a conceptual framework indicate a direct relationship, while a dotted arrow depicts a relationship that is conditional in nature. The central position of ESG integration within this framework confirms its role as a key principle that reconstructs traditional capital structure theory in the context of sustainable banking.

The end result of the interaction of these four paths is reflected in real capital structure decisions, such as leverage ratio, debt-equity composition, choice of financing sources, and capital adequacy management. As such, the framework not only provides an integrated theoretical foundation for understanding the relationship between ESG and capital structures, but also offers practical implications for bank managers, investors, and policymakers in dealing with sustainable financial dynamics.

Temporal Evolution of Understanding

The analysis of temporal developments shows that there are three different phases in the understanding of the relationship between ESG and capital structure. The exploration phase (2013–2019) was characterized by a focus on each ESG component separately as well as generally indirect relationships through performance variables. In this period, only 12 studies were published, with an emphasis on establishing fundamental relationships and conceptual foundations. The publication rate was relatively stable, with 4 studies in 2018 and 2019 respectively. The recognition phase (2020–2021) was marked by the beginning of the recognition of ESG as a separate determinant in capital structure decisions. The COVID-19 pandemic has

acted as a catalyst that accelerates attention to ESG, as reflected in the increase in the number of publications to 8 studies in 2020 and 9 studies in 2021. This period was also marked by increased methodological complexity as well as initial attempts to measure the relationship between ESG and capital structure more explicitly. Studies in this phase are beginning to place ESG as a key variable, rather than just a control variable or additional consideration.

Table 5. Temporal Evolution of High Relevance Studies Publications

Period	n	% Total	Phase Characteristics
2013-2019	12	14.3	Exploratory; individual components; Indirect Relationships
2020-2021	17	20.2	Recognition; COVID catalyst; emerging methodological rigor
2022-2024	55	65.5	Integration; ESG as primary determinant; Mechanism Identification

The integration phase (2022–2024) showed exponential growth, with 55 studies (65.5% of the total) published in the three-year period. This phase is marked by an explicit recognition that ESG is a key determinant, systematic identification of mechanisms, and a deeper understanding of contextual factors. Research published in this phase increasingly uses advanced econometric techniques, quasi-experimental design, and more comprehensive measurement approaches. This temporal pattern strongly indicates that this field of research is experiencing rapid knowledge accumulation and a paradigm shift in understanding the determinants of a bank's capital structure. In this context, ESG integration emerged as the main principle that became the basis for organizing contemporary capital structure theory, especially in the banking sector.

5 Conclusion

This study synthesizes empirical evidence on the influence of Environmental, Social, and Governance (ESG) integration on the bank's capital structure through a systematic analysis of 84 studies published during the period 2013–2024. The results show that ESG has evolved from a mere sustainability factor to a strategic determinant that influences the bank's capital structure decisions through reducing information asymmetry, improving access to funding, reducing capital costs, and strengthening risk management and financial performance. These findings indicate that the relationship between ESG and capital structure is multidimensional and therefore cannot be fully explained by conventional capital structure theory. Therefore, this research provides empirical support for the development of ESG-augmented capital structure theory that places sustainability factors as a core element in corporate funding decisions. From a practical perspective, the results of the study confirm the importance of integrating ESG in capital strategies, risk management, and sustainable financial policy development, both for bank management, investors, and regulators. However, this study still has limitations regarding the scope of literature sources and the heterogeneity of ESG measurements used in previous studies. Therefore, further research needs to develop more standardized ESG indicators as well as apply a more robust research design to identify causal relationships and contextual factors that influence the linkages between ESG and capital structure in various institutional and regulatory environments.

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