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Development of Bank Systemic Risk: Systematic Literature Review

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A B S T R A C T

This study analyzes the development of systemic banking risk using the Systematic Literature Review (SLR) method. The key variables examined include economic crises, financial market volatility, regulations, financial innovations, and external factors such as the COVID-19 pandemic. The sample selection process involved filtering journals from the Emerald and Science Direct databases, indexed in Scopus, with publications in English from 2019 to 2025, resulting in 35 relevant journals. The findings indicate that increasing interconnectivity among banks and the use of complex financial instruments have amplified systemic risk. Basel III regulations and macro prudential supervision play crucial roles in mitigating risks. This study provides insights for regulators and financial institutions to develop more effective strategies in maintaining global financial system stability.

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INTRODUCTION

The COVID-19 pandemic in the early 2020s had a widespread impact on the global economy (Ozili, 2021). This pandemic affected businesses worldwide, national healthcare systems, the food industry, the event industry, education, and global trade, triggering systemic risks. In addition to causing a sharp economic contraction and supply chain disruptions, the pandemic also induced panic in financial markets. Many banks faced liquidity pressures and heightened credit risks due to declining revenues and increased economic uncertainty.

As the COVID-19 pandemic spread, financial markets also suffered significant downturns. In March 2020, stock markets in the United States, Europe, and the Asia-Pacific region plummeted, with most stock indices worldwide experiencing the largest single-day declines on record. Although global stock markets eventually recovered, financial market uncertainty remained substantially high due to the ongoing pandemic. A study by Ali et al., 2020 reported negative returns and increased volatility in financial bonds and commodities of major economies. As new infections and fatalities were reported across various countries, global financial market volatility intensified, affecting the global financial cycle (Albulescu, 2021). Given the increasing interconnectedness between the financial system and the real economy, cross-border contagion effects were also evident amid the financial market turmoil caused by the COVID-19 pandemic.

Banks played a crucial role in responding to and mitigating the economic crisis. In times of uncertainty, banks served as pillars of confidence and stability, safeguarding customer deposits and providing liquidity to prevent the collapse of the financial system (Hidayat, 2024). However, the impact of the COVID-19 pandemic extended to banking activities. Declines in corporate and household investment and consumption, reduced repayment capacity, and liquidity crises not only led to a decrease in bank lending Li et al., 2021 but also resulted in a surge in non-performing loans (Park & Shin, 2021). Nonetheless, whether systemic financial stability particularly within the banking sector was fundamentally threatened by the COVID-19 outbreak remains a topic of debate.

The growing body of literature primarily discusses the impact of the COVID-19 pandemic on the banking sector, focusing on bank lending activities and credit risk (Park & Shin, 2021; Li et al., 2021; Elnahass et al., 2021). However, these studies do not directly address the systemic risk to banks arising from the COVID-19 pandemic. This study aims to explore the development of research on systemic risk in the banking sector, including the factors that influence it.

LITERATURE REVIEW

Bank Systemic Risk

Systemic risk refers to the risk of disruptions within the financial system that can lead to widespread economic instability, potentially resulting in the failure of multiple financial institutions and negatively impacting the economy as a whole (Acharya et al., 2017). This risk arises when the failure of a single entity or group within the financial system triggers a domino effect, affecting other institutions, industrial sectors, or even national and global economies (Bisias et al., 2012). Systemic risk represents the potential for events occurring at the level

of an individual bank to cause instability or even the collapse of the entire industry or economy.

De Bandt & Hartmann, 2021 define systemic events as occurrences that significantly affect multiple financial institutions or markets, thereby disrupting the stability and functionality of the overall financial system. They further describe systemic risk as the probability of such systemic events occurring, with potentially profound consequences.

Moreover, De Bandt & Hartmann, 2021 outline three key interrelated characteristics of the financial system:

a. The structure of banking and other financial institutions, in which banks typically hold only a small fraction of their assets to meet deposit withdrawal demands.
b. Interconnections between financial institutions through direct exposure and the payment system.
c. High dependence on information in financial contracts and credibility issues, which influence expectations regarding future asset values and the fulfillment of promised cash flows in contracts.

Financial Network Theory

Financial Network Theory emphasizes that banks are interconnected through various interbank transactions, loans, and other financial instruments. This interconnectedness makes the banking system vulnerable to risk contagion, where the failure of one institution can have widespread effects on others. This phenomenon is known as the Contagion Effect, in which financial distress experienced by one bank can spread to others due to close financial linkages.

Furthermore, the concept of Too Interconnected to Fail (TITF) explains that financial institutions with extensive connections to other banks pose a greater systemic risk in the event of failure. The more complex the financial network, the greater the potential impact of a single failure on overall system stability.

This theory is supported by the research of Haldane & May, 2011 in "*Systemic Risk in Banking Ecosystems*", which highlights how the structure of financial networks can accelerate the transmission of risk within the banking system.

Bank Run Theory

The Bank Run Theory, developed by Diamond & Dybvig, 1983, explains how depositor panic can lead to the mass failure of banks. If depositors lose confidence in a bank's ability to meet withdrawal demands, they will rush to withdraw their funds on a large scale. This situation exacerbates the bank's liquidity condition, forcing it to sell assets at discounted prices or even face bankruptcy. If such panic spreads to other banks, systemic risk can increase significantly.

One of the key factors that exacerbate this phenomenon is Moral Hazard and Adverse Selection, where banks that engage in high-risk activities are more prone to failure. In addition, Liquidity Mismatch results in an imbalance between short-term funding sources (such as deposits) and long-term loans provided by banks which can create liquidity difficulties when a sudden surge in withdrawals occurs.

This theory was further developed in the study by Diamond & Dybvig, 1983, "*Bank Runs, Deposit Insurance, and Liquidity*", which highlights the crucial role of deposit insurance and financial stability policies in preventing systemic risks caused by bank runs.

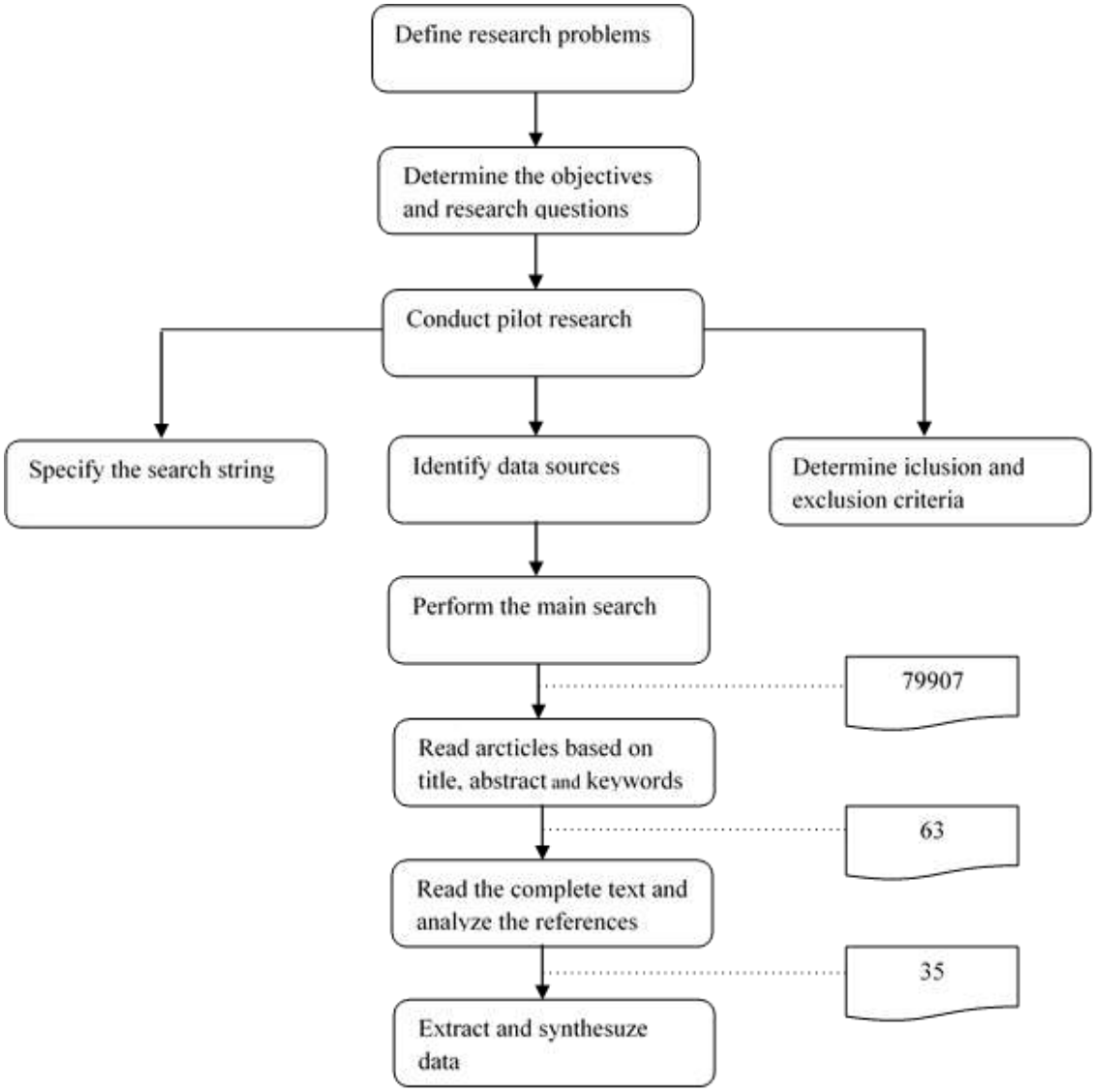

Figure 1. SLR Protocol

METHODOLOGY

This study employs the Systematic Literature Review (SLR) method. SLR is a research approach used to analyze a collection of scientific literature to develop insights, critical reflections, and future research directions (Meutia et al., 2022). This study follows the guidelines provided by Kitchenham et al. (2010), which were originally developed to assist researchers in conducting SLR in software engineering but have recently been adopted in review studies across various fields, as seen in the works of Turetken et al., 2020; Dikici et al., 2018; and Kitchenham et al., 2010.

Following these guidelines, this study utilizes leading electronic databases, Emerald and ScienceDirect, both indexed in Scopus. The inclusion and exclusion criteria were established using keywords such as "bank systemic risk" and "systemic financial risk", with publications restricted to those in English and within the timeframe of 2019–2025. As a result, 35 studies were identified, focusing on banking institutions, financial organizations, and fintech companies.

RESEARCH RESULT

The Systematic Literature Review (SLR) includes 35 articles that discuss the development of bank systemic risk. The following section provides a detailed explanation of the findings.

Research Developments on Bank Systemic Risk

This section presents an in-depth analysis of the reviewed studies, focusing on the following aspects, list of studies, research paradigms, sources of journal publications, journal indexing, year of publication, research period, country of study, research objects, theories utilized in the studies, measurement of systemic risk variables and research findings.

Table 1. Research Findings

No	Author	Factors Affecting	Research Findings		
			Positive effect	Negative Effect	Effect No Significant Effect
1	Zhu et al., 2025	Climate risk	Positive		
2	Liu, Wang, et al., 2024)	Climate policy uncertainty		Negative	
3	Z. Wang & Liu, 2025	Physical environmental risks and Investor concerns	Positive		
4	Alexandre et al., 2024	Nestedness and INC	Positive		
5	Haoran et al., 2024	Development of digital technologies	Positive		

No	Author	Factors Affecting	Research Findings		
			Positive effect	Negative Effect	Effect No Significant Effect
6	Yang et al., 2024	Risk spreaders	Positive		
7	K. Wang et al., 2024	Dramatic volatility in oil prices	Positive		
8	Y. Wang, Song, et al., 2025	Geopolitical risks and banking regulation	Positive		
9	Y. Wang, Lu, et al., 2025	Sudden halt in capital inflows and macroprudential policies	Positive		
10	Liu, Sadiq, et al., 2024	Interbank deposits	Positive		
11	Rizwan et al., 2025	Central bank digital currency		Negative	
12	D. Wang et al., 2024	temperature variability	Positive		
13	Moura et al., 2024	Risk taking by Brazilian banks	Positive		
14	Fang et al., 2024	Media sentiment, deposit stability	Positive		
15	Nguyen et al., 2024	Structured factor copulas	Positive		
16	Zhao et al., 2024	Digital transformation		Negative	
17	Saklain, 2024	FinTech and FinTech Growth, regulation, stock returns			Non Significant
18	Fan & Hu, 2024	General asset ownership	Positive		
19	Birindelli et al., 2024	Bank engagement in climate change efforts		Negative	
20	Fang et al., 2023	Policy uncertainty		Negative	
21	Saghi et al., 2023	Ownership structure	Positive		
22	Adasi Manu & Qi, 2023	CEO social network, CEO network centrality	Positive		

No	Author	Factors Affecting	Research Findings		
			Positive effect	Negative Effect	Effect No Significant Effect
23	He et al., 2023	Economic volatility and banking risk accumulation	Positive	Negative	
24	Lu & Wang, 2023b	Macroprudential policy and national culture		Negative	
25	Chen & Shen, 2023	Deposit Insurance (DI) System and Risk Adjusted Premium (RAP) Scheme		Negative	
26	Bellavite Pellegrini et al., 2022	Shadow banking (shadow banks) and the real estate sector	Positive		Non Significant
27	Lu & Wang, 2023a	Banking liquidity accumulation		Negative	
28	Rahman et al., 2024	interbank interconnection contributes	Positive		
29	Yan et al., 2023	Impact of COVID-19 pandemic	Positive		
30	Kumar et al., 2024	Bank characteristics	Positive		
31	Tzouvanas, 2024	idiosyncratic risk	Positive		
32	Ivanov & Jiang, 2020	secularization of bank lending	Positive		
33	Qi et al., 2022	interbank connectivity	Positive		
34	Choudhury & Daly, 2021	shock size and transmission rate	Positive		
35	Qi et al., 2021	Interconnectedness Between Institutions	Positive		

Research Paradigm

All 35 empirical research articles included in this study adopt a quantitative research paradigm.

Journal Sources

Figure 2 below presents the indexing of the published journals.

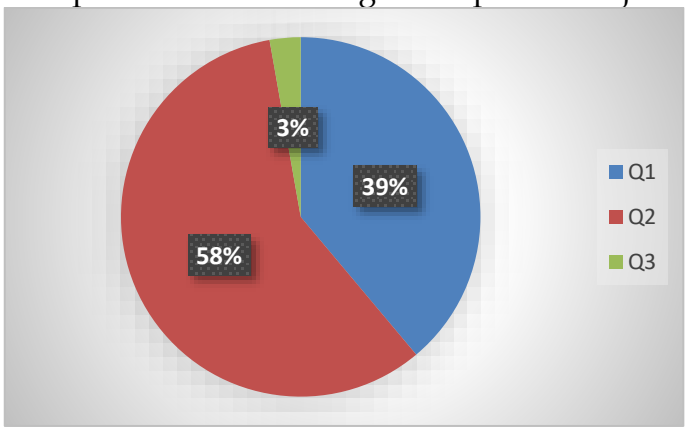

Figure 2. Journal Sources

Figure 2 illustrates the reputation of journals indexed in Scopus, detailing the distribution across Q1, Q2, and Q3 journals, with 14, 21, and 1 articles, respectively.

Six publications appear in Finance Research Letters (Q1), making it the most frequently cited journal in this review. This is followed by three publications each in the Journal of International Financial Markets, Institutions and Money and the International Review of Financial Analysis (Q1). Additionally, there are two publications each in the Journal of Financial Stability, Heliyon, and Research in International Business and Finance (Q1), while the remaining studies are distributed across 28 other journals.

Year of Publication

Figure 3 presents the publication years of the reviewed research articles.

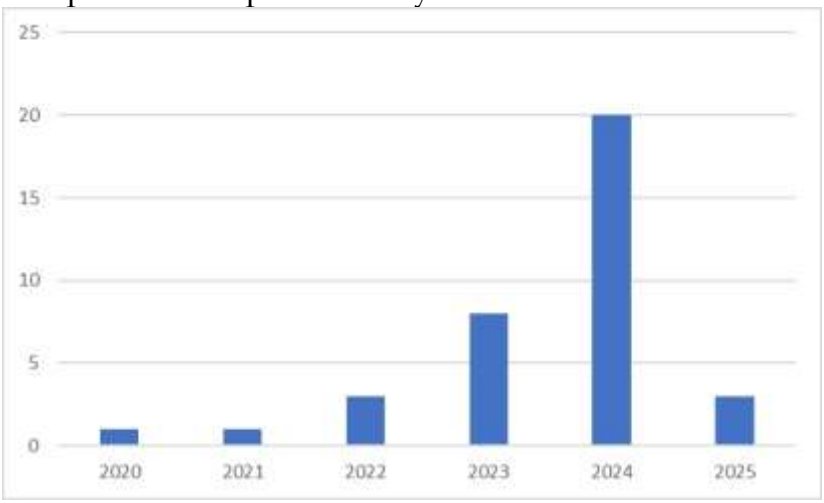

Figure 3. Year of Article Publication

Figure I illustrates that the highest number of published articles appeared in 2024, totalling 20 research articles. This is followed by 8 articles in 2023, 2 articles in 2022, and 1 article each in 2021 and 2020. As for 2025, only 3 articles have been published so far, as the current date is still February 2025.

Research Period and Country of Study

Among the 35 selected articles, the earliest research was conducted in 1996, with studies spanning until 2022. For instance, Tzouvanas, 2024 conducted a study covering the period 1990–2021 on the U.S. banking sector, analyzing over 30 years of data.

Most researchers selected a study period exceeding ten years, while a few focused on shorter periods (below ten years), such as the studies by Z. Wang & Liu, 2025; Alexandre et al., 2024; Haoran et al., 2024; Rizwan et al., 2025; Fan & Hu, 2024; Rahman et al., 2024; Qi et al., 2021.

The geographical scope of these studies is diverse, with some studies analyzing data from multiple countries or even a global sample, such as Birindelli et al., 2024. The research predominantly focuses on developed and developing countries, including China, the United States, the European Union, Brazil, India, and other nations.

Research Objects

Figure 4 below illustrates the research objects, which include the banking sector, financial institutions, fintech companies, and banks.

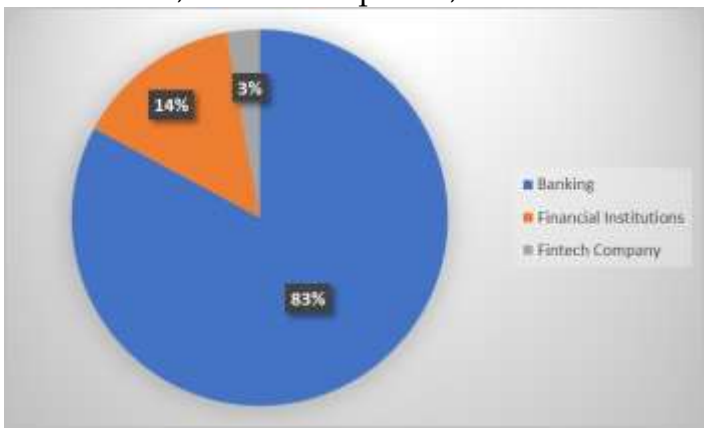

Figure 4. Research Objects

In Figure 4 above, 83% of the studies selected the banking sector as their research object, while 14% focused on financial institutions. These financial institutions include banks, securities firms, insurance companies, diversified financial entities, brokerage firms, trust organizations, and others. Additionally, 3% of the studies examined the fintech sector and banks.

The detailed breakdown of the research objects presented in Figure IV is further explained in Table II below.

Table 2. Research Object Details

Authors	Research Object	Authors	Research Object
Zhu et al., 2025	Finansial Institution	Birindelli et al., 2024	211 Bank
Liu, Wang, et al., 2024)	603 Bank and 307 Banks	Fang et al., 2023	784 Banks
Z. Wang & Liu, 2025	26 Banks	Saghi et al., 2023	Banks
Alexandre et al., 2024	Banks	Adasi Manu & Qi, 2023	939 Banks
Haoran et al., 2024	More than 5000 Financial Institution	He et al., 2023	24 Banks
Yang et al., 2024	40 Financial Institution	Lu & Wang, 2023b	872 Banks
K. Wang et al., 2024	59 Financial Institution	Chen & Shen, 2023	46 Banks
Y. Wang, Song, et al., 2025	688 Banks	Bellavite Pellegrini et al., 2022	43 Banks
Y. Wang, Lu, et al., 2025	1724 Banks	Lu & Wang, 2023a	457 Banks
Liu, Sadiq, et al., 2024	506 Banks	Rahman et al., 2024	Banks
Rizwan et al., 2025	1461 Banks	Yan et al., 2023	900 Banks
D. Wang et al., 2024	105 Banks	Kumar et al., 2024	36 Banks
Moura et al., 2024	49 Banks	Tzouvanas, 2024	2667 Banks
Fang et al., 2024	Banks	Ivanov & Jiang, 2020	Banks
Nguyen et al., 2024	38 Banks	Qi et al., 2022	49 Banks
Zhao et al., 2024	183 Banks	Choudhury & Daly, 2021	60 Banks
Saklain, 2024	39 FinTech Company and 20 Banks	Qi et al., 2021	58 Financial Institution
Fan & Hu, 2024	193 Bank		

Research Theories

Figure 5 presents various theories related to this research topic. Financial Network Theory is the most frequently used theory, appearing in four studies. Systemic Risk Theory and Extreme Value Theory are each utilized in two studies. The remaining studies adopt other theories. Additionally, 23 studies do not specify a particular theoretical framework.

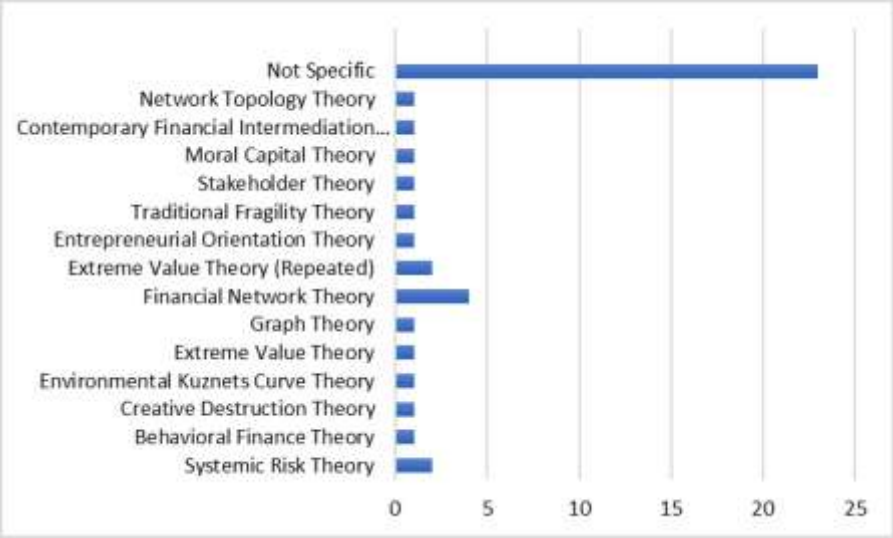

Figure 5. Research Theories

Measurement of Systemic Risk Variables

Table 3 below presents the various measurement approaches employed by researchers.

Table 3. Measurement Methods Used

Indicator	Author	Total
Risk in Financial Sub-Markets	Zhu et al., 2025	1
Marginal Expected Shortfall (MES)	Liu, Wang, et al., 2024; Y. Wang, Song, et al., 2025; Liu, Sadiq, et al., 2024; Saklain, 2024; Chen & Shen, 2023; Bellavite Pellegrini et al., 2022; Yan et al., 2023; Qi et al., 2021.	8
Delta Conditional Value at Risk (ΔCoVaR)	Liu, Wang, et al., 2024; Z. Wang & Liu, 2025; Yang et al., 2024; K. Wang et al., 2024; Y. Wang, Song, et al., 2025; Y. Wang, Lu, et al., 2025; Liu, Sadiq, et al., 2024, Moura et al., 2024; Saklain, 2024; Saghi et al., 2023; Adasi Manu & Qi, 2023; He et al., 2023; Chen & Shen, 2023; Bellavite Pellegrini et al., 2022; Rahman et al., 2024; Yan et al., 2023; Kumar et al., 2024;	19

	Tzouvanas, 2024; Ivanov & Jiang, 2020.	
Metodologi Differential DebtRank - Systemic Impact (SI) and Systemic Vulnerability (SV)	Alexandre et al., 2024.	1
SRISK	Haoran et al., 2024; Y. Wang, Song, et al., 2025; D. Wang et al., 2024; Zhao et al., 2024; Birindelli et al., 2024; Fang et al., 2023; Adasi Manu & Qi, 2023; Lu & Wang, 2023b, Chen & Shen, 2023; Bellavite Pellegrini et al., 2022; Lu & Wang, 2023.	11
MS-VAR	Fang et al., 2024.	2
CAFTIN	Rizwan et al., 2025.	1
CBDC	Rizwan et al., 2025.	1
Probability of Distress (PD), Joint Probability of Distress (JPD), Expected Proportion in Distress (EPD), Expected Shortfall (ES)	Nguyen et al., 2024.	1
LRMES	Saklain, 2024.	1
Algoritma DebtRank	Fan & Hu, 2024.	1
NLP	He et al., 2023.	1
Systemic Expected Shortfall (SES)	Qi et al., 2021.	1

Table 3 presents various instruments identified for measuring systemic risk. The most commonly used measurement approaches are ΔCoVaR and SRISK. ΔCoVaR measures the change in systemic banking risk when a specific bank is under distress compared to its median condition, thereby quantifying its systemic risk contribution. Researchers calculate ΔCoVaR following Adrian & Brunnermeier, 2016 and multiply it by −100 for display purposes. On the other hand, SRISK is a method used by regulators and academics to assess banking system resilience and identify financial institutions that may contribute to systemic crises Acharya et al., 2017.

DISCUSSION

Systemic risk in the banking sector continues to evolve in line with the increasing complexity of the global financial system. This risk arises when the failure of one or more major banks significantly impacts the stability of the financial system as a whole, disrupting intermediation functions and potentially triggering economic crises. The Financial Stability Board (FSB,2021) defines systemic risk as a disruption in the financial system that negatively affects the real economy and erodes public confidence in the financial sector. One of the key drivers of systemic risk is the growing interconnectivity between banks, where high dependence on payment systems and financial markets accelerates crisis transmission. The 2008 financial crisis is a prime example, where the collapse of Lehman Brothers caused global panic and exacerbated economic downturns (Bernanke, 2013).

Additionally, financial innovations such as derivatives and securitization have amplified systemic risk potential. Complex financial products often obscure underlying risks, which only become apparent during market shocks. The Bank for International Settlements (BIS, 2019) highlights that the uncontrolled expansion of the derivatives market increases uncertainty and can lead to widespread liquidity crises. Moreover, banks' reliance on short-term funding contributes to systemic risk, as liquidity pressures may trigger bank runs, leading to a chain reaction of bankruptcies within the financial sector (Mishkin, 2016).

Beyond economic and structural factors, technological advancements present new challenges in the form of cyber risk. Cyberattacks on banks can cause widespread operational disruptions, threatening global financial stability (Claessens & Kose, 2018). Various factors influence systemic risk in banking and financial institutions, including climate risk, digital technology advancements, asset ownership, leadership structures, and banks' contributions, as detailed in Table I. From 35 analyzed studies, 25 reported a positive impact, 9 found a negative impact, 1 found a non-significant effect, and 1 study found both positive and non-significant effects on systemic risk.

Regarding systemic risk measurement, the three most widely used approaches among the 35 studies are, Marginal Expected Shortfall (MES) – used in 8 studies, Delta Conditional Value at Risk (ΔCoVaR) – applied in 19 studies, and SRISK – utilized in 11 studies.

To mitigate systemic risk, financial regulators have implemented various policies. A key measure is the Basel III regulatory framework, which strengthens capital and liquidity requirements to enhance banks' resilience to crises (BCBS, 2011). Additionally, macro prudential supervision has been reinforced to identify systemic risks before they escalate into larger crises (FSB, 2021). Institutions such as deposit insurance schemes (e.g., Lembaga Penjamin Simpanan, LPS) and lender-of-last-resort mechanisms from central banks help maintain public confidence in the banking sector, preventing mass panic and minimizing the adverse effects of financial instability (Mishkin, 2016). Furthermore, transparency in financial reporting and the implementation of sound corporate governance are crucial in reducing systemic risk (Claessens & Kose, 2018).

CONCLUSIONS AND RECOMMENDATIONS

This study examines the evolution of systemic risk in the banking sector, particularly in addressing global economic challenges and the potential for financial crises. Systemic risk arises when disruptions in one or more financial institutions have widespread effects on the entire system, leading to economic instability. The study reveals that the COVID-19 pandemic has exacerbated systemic risk in banking by increasing market volatility, undermining credit repayment capacity, and causing widespread liquidity crises. Furthermore, technological advancements, financial innovations such as derivatives, and the increasingly close interconnections between banks have further amplified the potential for systemic risk.

Utilizing a Systematic Literature Review (SLR) approach, this research identifies various factors that influence systemic risk in banks, including macro prudential policies, banking regulations, economic volatility, as well as the impacts of climate change and digital transformation on the stability of the financial system. A number of indicators have been employed in previous studies to measure systemic risk, including CoVaR, SRISK, and Marginal Expected Shortfall (MES), providing deeper insights into the evolution of systemic risk across different countries and banking sectors.

Moreover, this study comprehensively outlines the developments in research on systemic risk in banking by detailing the research paradigms employed, publication and study years, research subjects, theoretical frameworks used, and the findings of these studies. To address systemic risk, the study underscores the importance of implementing stricter regulations such as Basel III, enhancing macro prudential oversight, and adopting improved corporate governance practices. Additionally, mitigation policies such as lender-of-last-resort mechanisms and the role of deposit insurance institutions (e.g., Lembaga Penjamin Simpanan, LPS) are considered crucial in maintaining the stability of the banking sector. By understanding the factors influencing systemic risk, regulators and financial institutions can develop more effective strategies to ensure that the financial system remains stable in the face of future economic challenges.

ADVANCED RESEARCH

This study provides several recommendations that can serve as considerations for future research and relevant stakeholders. First, future studies should cover a broader scope, including global economic factors and the impact of government policies on systemic risk in the banking sector. Second, research methods can be improved with more advanced approaches, such as using more complex statistical models or artificial intelligence (machine learning) technology to enhance the accuracy of systemic risk predictions. Third, the findings of this study can serve as a reference for regulators and banking stakeholders in formulating more effective policies to mitigate systemic risk.

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