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LEVERAGING FINANCIAL NETWORKS FOR SUSTAINABLE OUTCOMES: AN INTEGRATIVE LITERATURE REVIEW¹

Summary

Purpose | The study aims to explore the integration of financial networks with sustainability goals and examine the challenges and potential of this relationship. It seeks to understand the historical trajectories of financial networks and decipher how they can be leveraged for sustainable development.

Research method | An integrative literature review of peer-reviewed journals from the past decade was employed. The research was conducted in two stages: first, examining the evolution of financial networks; second, interpreting these findings in the context of sustainable development, with sustainability as a primary filter in the review.

Results | The outcomes highlight the complexity, vulnerability to instability and contagion, globalisation, centralisation, and the impact of technology on financial networks as the main features of their modern development. The findings emphasise the recent convergence of financial systems with sustainability imperatives, reflecting businesses' multifaceted responses to these pressures. Financial networks navigate between traditional economic practices and emerging sustainability requirements.

Originality/value/implications/recommendations | The study offers insights into integrating sustainability within financial frameworks to address the urgent need to re-configure financial systems' practices to mitigate their adverse impacts on sustainable

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development. The research underscores the importance of resilient, transparent, and adaptable financial networks amid global interconnectivity, dependencies, and associated risks.

Keywords: financial networks, sustainable development, EU taxonomy, systemic risks, integrative review

JEL classification: G18, G28, Q01, Q58

1. Introduction

Following Leitner [2005], in this research, financial networks are understood as connections between participants in financial markets, facilitating cooperation and spreading financial phenomena, such as contagion risk. Financial networks encompassing traditional institutions and newer entities, such as digital payment platforms and cryptocurrencies, are evolving rapidly. They are increasingly central to discussions around economic strategies and sustainable outcomes. The European Union's financial taxonomy reflects a movement towards integrating sustainability within financial frameworks, balancing traditional financial functions with sustainable goals. Sustainability, encompassing key dimensions such as environmental sustainability and social inclusion, is increasingly integral to the broader themes of corporate responsibility, risk, and opportunity [Sekol, 2024]. Driven by the urgency of contemporary challenges and the transformative power of financial networks, this study dives into understanding this interplay.

While literature addresses financial networks in isolation in extent, only some researchers tackle their interrelation with sustainability objectives, revealing a research gap. The study explores financial networks' historical trajectories and frameworks, seeking to decipher how they can be leveraged to support and innovate sustainable pathways. Viewed through the prism of the business perspective, sustainable development fundamentally challenges and redefines the paradigms of business models, ensuring they align with the planet's long-term well-being and that of its inhabitants. This contrasts with corporate social responsibility, which, while central to integrating environmental protection with commerce, typically operates within existing business paradigms.

The study followed an integrative literature review approach. The literature search focused on the Web of Science Core Collection and covered publications from 2013 to 2023. The inclusion criteria incorporated peer-reviewed journal articles, books, and conference proceedings published between 2013 and 2023. The search employed the term “Financial networks” to capture all relevant studies. In an initial exploration of 117 scholarly works (see Appendix), several key themes were identified that shape the architecture of these systems: centralisation, complexity, vulnerability, globalisation, and technology. Subsequently, these findings were interpreted within the context of sustainable development. The review places less emphasis on publications focusing solely on the financial and economic dimensions, aligning with the foundational principles of sustainability. Similarly, the resilience of financial networks, though extensively researched, is considered in the context of sustainability.

As a result, the structure of this study unfolds as follows: the subsequent section delves into the evolution of financial networks in the contemporary world, elucidating the characteristics that define modern financial systems. The following section narrows the focus to the direct impact of financial networks on societal and environmental imperatives, shedding light on the challenges and opportunities they present in shaping sustainability. Finally, the concluding section synthesises the findings, draws implications from the exploration, and describes research limitations and suggestions for future research.

2. Financial networks’ modern evolution

For the last decade, the vast body of research on finance has predominantly concentrated on markets and prices, emphasising a country-based scale of analysis and oversight of dynamics that underpin financial networks. An exception is the book by Haberly and Wójcik [2022], which emphasises the trend towards specialisation and centralisation. According to the authors, the inherent drive of finance towards integration means that larger financial markets function more efficiently, often leading to the dominance of a few pivotal financial centres. This centralising impetus encompasses not just geo-

graphical locations but also entities. Leading firms in finance usually resemble market monopolies, especially in areas like investment or merchant banking. Moreover, democratising access to financial tools via digital platforms paradoxically furthers this centralisation. Digital platforms create oligopolistic structures where a few platforms dominate the marketplace. Their robust infrastructure and vast data repositories give them a comparative advantage, enabling them to compete, if not outpace effectively, newer market entrants.

Studying scholarly investigations from the past decade reveals a shift from the abovementioned image. Instead, “Complexity” has emerged as a dominant theme (41%). This rise in complexity is attributed to multifaceted interactions and interdependencies in the financial environment. As highlighted by Jackson and Pernoud, financial contracts facilitate numerous functions, from bridging liquidity variations to fostering collaborative investments. Furthermore, financial institutions are interconnected through correlated exposures, crafting a nuanced web of dependencies even without direct transactions. Interconnectedness does not necessarily equate to uniformly strong ties between all entities; as Keller-Ressel and Nargang [2021] note, the dominance of a “sparse backbone” of potent connections amidst a plethora of weaker links. Building on Töpfer’s [2018] study, it becomes evident that the Chinese system symbolises the intricate layers where state-controlled mechanisms interweave with corporate objectives, showing complicated, multi-layered structures within financial networks. Their entwinement with political and institutional arrangements is evident in other studies scrutinising and shaping the multifaceted interactions inherent in the financial network landscape. For example, the insights by Grilli et al. [2020] illuminate the interconnected nature of banks and firms, suggesting that their interdependence plays a pivotal role in shaping the stability and vulnerability of financial networks. Notably, credit connections, governed by evolving lender attractiveness and borrower satisfaction, are constantly in flux and influenced by agents’ abilities to toggle between loyalty and diversification in their lending and borrowing activities. Caraianni and Lazarec’s [2021] study posits that financial networks are fluid in their correlated exposures. These researchers underscore the dynamic evolution of such networks as they respond to external perturbations, notably monetary policy shocks. Consequently, this leads to a heightened disorder and unpredictability within the system, which they quantify using an entropy measure. References to the changing param-

eters of policy interventions that influence the behaviours of entities within the financial network, leading to adaptation and modification of the network's structure itself, can also be found in other studies [e.g. Banerjee, Guhathakurta 2020; Keller-Ressel, Nargang 2021]. Lopomo Beteto Wegner [2019], delving into the dynamic facets of financial networks, highlights the driving mechanisms behind their transformations and the factors influencing their stability. He sheds light on the unintended repercussions of liquidity policies, such as quantitative easing, on financial vulnerability. The increase in advanced risk management techniques also evidences the complexity trend [e.g. Jackson, Pernoud, 2021; Hemenway, Khanna, 2016; Keller-Ressel, Nargang, 2021; Yen et al., 2021; Cui et al., 2018]. The evolution of these techniques accompanies the changing nature of the network and the inherent risks within. The significance of the interdisciplinary approaches becomes apparent in the comprehensive perspective they provide in the study of financial networks. For instance, the work of Yen et al. [2021] blends insights from both econophysics and finance, studying a stock market crash in Taiwan. Cui et al. [2018] demonstrate how mathematical tools, such as graph kernels, can be effectively applied to analyse the dynamic structures of financial markets, highlighting the evolving complexity within the New York Stock Exchange. Another example is the use of spatial econometric techniques by Dungey et al. [2022]. They analyse the role of network exposure in shock transmission and absorption and highlight the influence of network intensity and interconnectedness on the financial system's vulnerabilities.

"Vulnerability" of financial networks to instability and contagion constitutes the second most frequently discussed topic in the literature dedicated to financial networks' evolutionary patterns (31%). As financial networks evolve in complexity, their heightened susceptibility to systemic and idiosyncratic shocks emerges as an increasingly pivotal area of academic inquiry. Among the plethora of studies on the topic, Jackson and Pernoud [2021] provide an overview of the relationship between financial networks and systemic risk. Hemenway and Khanna [2016] investigate the causes of instability and contagion in financial networks, discussing the challenges of understanding risks in complex financial networks. Additionally, Elliott et al. [2014] examine cascades of failures in a web of interdependent financial organisations and the effect of network structure on the extent of these cascades.

“Globalisation” (22%), which comes third, while a salient feature of financial networks with escalating interconnectedness within the global financial ecosystem, has a somewhat secondary position compared to previous categories. This might indicate a maturing perspective on this subject, particularly concerning its implications on financial markets. Luxembourg and Ireland emerge as prime examples of the intricate weave of international connections. Wójcik et al. [2022] provide a comprehensive insight into this phenomenon. They analyse how the financial sectors of these nations have witnessed exponential growth, primarily due to their favourable regulatory frameworks and tax incentives, which attract a myriad of global financial entities. As international hubs for investment funds and banking operations, they epitomise the deepening interdependence of global financial systems. The benefits of globalisation, particularly its inherent advantages of scale and scope, have led to increased peace and prosperity, as outlined by Jackson and Pernoud [2021, p. 172]. However, the authors also highlight the growing complexity of expansive financial nodes, which augments systemic vulnerabilities. As they explain, this intricate interplay among financial entities can amplify disturbances, facilitating the spread of shocks throughout the system, yielding impacts that far exceed initial disruptions; as the 2008 financial downturn showed this, where complications within the mortgage sector induced broad insolvencies affecting not just the U.S., but having global repercussions, spiralling into a long-lasting economic recession.

The fourth in sequence, “Centralisation” (21%), sheds light on an intrinsic tension in the financial sector. The article by Zakhozhyi and Ma [2023], echoing the dynamics outlined by Haberly and Wójcik [2022], spotlights collaborations between large platforms and local businesses that could potentially reinforce the stature of these major entities. These dominant figures might extend their sway even further with improved access to technology and information. Digital technologies may not be universally accessible, and such restricted access could promote centralisation. Korniyenko et al. [2018], investigating the global financial system, highlight the rising prominence of vital financial hubs, indicating a clear evolutionary trajectory: from fragmented, localised financial markets towards integrated, centralised hubs that significantly influence global financial flows. This shift signifies geographic centralisation and

underscores a transformation in the concentration of financial transactions and influences.

Finally, “Technology”, despite its revolutionary influence in the financial arena, was referenced in the fewest abstracts (15%), which could suggest a more focused research interest in other facets of financial networks or a different lens of technology assessment within the overarching themes. In this context, and more broadly regarding the nature of the evolution of financial networks, the study by Gancarczyk et al. [2022] provides insightful conclusions. Their analysis reveals that fintech has notably reshaped the governance structure in banking, giving rise to a dual framework: a global web of financial networks and a diverse patchwork of regional financial ecologies. While initially led by traditional banks, this transformation is no longer their sole domain.

Most publications (63%) concentrate on a single aspect of financial networks. The remaining publications primarily cover two themes (30%). The most common thematic intersections involve Complexity, followed closely by Globalisation, Centralisation, and Vulnerability. The most common thematic pairings (46%) are Complexity with Vulnerability and Globalisation with Centralisation. The complexity of financial networks, characterised by intricate interdependencies and dense connections, directly contributes to their vulnerability. The overlapping area here underscores the challenge of managing risk in an environment where the failure of a single entity can have far-reaching effects, as well as risk management strategies and regulatory oversight to mitigate potential systemic failures. Concurrently, globalisation fosters centralisation by concentrating financial flows and activities within global financial hubs, amplifying their significance and influence within the international financial system.

3. Financial networks’ role in societal and environmental concerns

An informed observer will notice that although isolating the social dimension of sustainability from the environmental one may facilitate the analysis and presentation of specific issues, this distinction does not alter their inherent

interdependence. Through their interconnections and flow of capital, financial networks impact both social equity and ecological balance. Still, by separating them, one can focus on specific factors and targeted strategies, particularly where trade-offs exist between them.

The social dimension of the financial networks' impact pertains primarily to their inherent complexity, particularly the close links between institutions, which intensify risks and vulnerabilities. While multi-layered structures and dynamic interactions might cushion financial systems, they can also increase the network's susceptibility to domino effects, jeopardising social and other sustainable goals, i.e. economic and environmental. The vulnerability of these networks to instability and contagion accentuates the need for robust safeguards. If unchecked, systemic risks can lead to cascading failures, threatening ecological objectives and social equity in affected regions. Additionally, globalisation underscores the significance of cross-border collaboration. When fostered responsibly, international linkages can lead to shared best practices and equitable growth, which is essential for global sustainability.

Moreover, the dynamics of financial networks, defined by centralisation and specialisation, highlight the complexities of resource allocation. Achieving equilibrium in this distribution is essential for aligning with the social dimension. It is worth noting that although the observation on resource allocation for sustainable development is universal and pertains to many sectors, in the context of financial networks, it takes on additional significance. This arises from the role that finance plays in the global economy, and a sustainable allocation of resources in this sector can have far-reaching consequences for sustainability. When it comes to the merger of financial networks with technology, it presents a double-edged nature. While digital platforms can democratise access and reduce operational footprints, they also demand rigorous oversight to ensure they support, rather than undermine, sustainable financial practices.

Financial networks play a critical role in determining the sustainability of investments. McGrath et al. [2017] introduce the "metacity" concept, which evolves in response to global financial networks and neoliberal trade policies

while deeply rooted in local ecologies and living environments. Although the research rarely directly addresses “sustainability”, grounding the metacity in ecological and local life contexts suggests that sustainability is a central consideration. The integration of environmental factors within financial networks here highlights the need for financial systems to adapt to economic demands and the preservation of local ecosystems and biodiversity. Balancing urban expansion with ecological conservation is essential to mitigate environmental degradation and maintain sustainable development.

Li et al. [2017] develop an innovative framework for assessing risk contagion in financial networks, blending these systems with machine learning techniques. Sustainability plays a key role in this framework, particularly through the robustness of financial systems amidst complex and interconnected relationships. The authors point out the potential spillover effects from non-ESG investments, which can undermine the goals of ESG portfolios, stressing the need for financial systems to align with broader environmental objectives. The risks associated with unsustainable investments highlight the potential environmental impact of financial instability, affecting efforts to combat climate change and other ecological challenges.

Manta et al. [2020] focus on new financial instruments that address climate change challenges and analyse green financing models with their effects on corporate finances. They advocate for a shift from financial optimisation to sustainability, urging the integration of environmental considerations into financial decision-making. This transition is crucial in addressing global environmental challenges, such as reducing carbon emissions and promoting renewable energy sources. The shift in financial practices toward sustainability can drive significant environmental benefits, aligning corporate and financial strategies with long-term ecological goals.

Kim et al. [2019] re-evaluate the financial network supporting the REDD+ initiative, which aims to reduce emissions from deforestation and forest degradation. They argue that the current financial framework must better accommodate the diverse needs of developing nations working toward sustainable forest management. Centralisation within the REDD+ financial network has led to inefficiencies and disparities, limiting some countries’ ability to address

deforestation and climate change. This underscores the critical need for a more equitable distribution of financial resources to achieve meaningful environmental progress, particularly in safeguarding biodiversity and forest ecosystems.

Wilson [2016] critiques the outcomes of the Millennium Villages Project in Bonsaaso, Ghana, noting the socio-environmental consequences of an influx of foreign gold miners. The resulting socio-ecological crisis illustrates how poorly managed financial initiatives can exacerbate environmental degradation and disrupt local ecosystems. This case demonstrates the risks of failing to integrate ecological considerations into financial and development strategies, potentially leading to long-term damage to local communities and the environment.

D'Orazio and Popoyan [2019] highlight the role central banks could play in mitigating climate change, given their influence over the financial system. They emphasise that while awareness of climate-related risks increases, gaps in international regulatory frameworks leave the financial sector vulnerable to climate-induced losses. These gaps undermine global climate goals, indicating the need for regulatory reforms incorporating climate risks into financial stability measures. Without these reforms, the financial sector may continue contributing to environmental degradation rather than supporting efforts to combat climate change.

Gancarczyk et al. [2022] explore the digital transformation of the banking sector driven by financial technologies. The dual nature of this transformation presents both opportunities and challenges: fintech innovations can expand access to financial services, but they may also lead to issues such as over-indebtedness or exclusion. Additionally, the environmental impact of digital financial systems remains uncertain. While fintech may reduce resource consumption in some areas, the energy use associated with digital infrastructure poses new ecological challenges. Ensuring these technologies are developed and deployed environmentally is crucial for aligning fintech with sustainability goals. Table 1 summarises the dual role of financial networks in shaping sustainability.

TABLE 1
Financial networks' role in sustainability

Sustain-ability	Stimulating	Impeding	Sources
Environmental	Financial networks contribute to green investments, e.g. through the REDD+ programme, designed to combat deforestation. Blockchain technology enhances transparency in tracking environmental projects.	Centralisation in REDD+ limits equitable access to funds, increasing inefficiency and disparities in addressing deforestation and climate change. Financial contagion and systemic risks within networks can destabilise investments and jeopardise ecological objectives.	Kim et al. [2019]; Elliott et al. [2014]; Gancarczyk et al. [2022]; McGrath et al. [2017]; D'Orazio, Popoyan [2019]
Social	Fintech expands access to financial services for marginalised communities, fostering inclusion and reducing poverty. Decentralised financial networks distribute risks, making economies more resilient to global shocks. Fintech innovations can democratise financial access, boosting economic resilience in underserved regions.	Over-indebtedness and exclusion occur if fintech platforms are poorly regulated, disproportionately affecting vulnerable groups. Digital platforms may centralise control, further excluding specific populations. Centralisation of decision-making in a few global hubs increases systemic risks, threatening financial stability and impeding global economic equity. Without oversight, fintech can increase systemic risks. Systemic risks from interconnected financial institutions can compromise resilience in vulnerable regions and deepen inequality.	Gancarczyk et al. [2022]; Kim et al. [2019]; Elliott et al. [2014]; D'Orazio, Popoyan [2019]; Wilson [2016]; McGrath et al. [2017]

Source: the author's elaboration.

4. Conclusions

The study contributes to the academic discourse by examining the intersection of financial networks with sustainability frameworks, addressing the complexities of integrating economic, social, and environmental dimensions. Through

an integrative literature review, the research builds upon the existing understanding of financial networks' structural evolution, highlighting the challenges of globalisation, centralisation, and technological advances. Furthermore, the study draws attention to these networks' systemic risks and vulnerabilities, advocating for more resilient and transparent financial practices that align with sustainable development objectives.

The literature exploration underscores the transformative potential of financial networks in shaping sustainable development. Historical perspectives highlight the recent rendezvous of financial systems with sustainability and the nuanced ways businesses may interpret and respond to sustainability pressures. Historically designed to cater to economic efficiencies, financial networks now stand at a crossroads, with paths leading to traditional practices on the one hand, and sustainable integrations on the other. Exploring the complexities of intertwining financial networks with sustainable imperatives highlights the paramount importance of transparency, flexibility, and adaptability.

As elucidated through the exploration, the complex patchwork of the financial landscape offers dualities of specialisation and centralisation. While shaping the modern financial ecosystem, these forces also underscore the tension between the desire for a democratised financial space and the strong gravitation towards dominant power centres. As amplified by technology adoption, this centralisation often comes with the cost of escalating systemic vulnerabilities.

Furthermore, while showcasing the intricate interdependencies, the heightened complexity highlights the financial system's increased susceptibility to systemic and idiosyncratic shocks. The continued integration of global markets elucidates both the benefits and pitfalls of globalisation. While the sector experiences significant expansion and economic gains, concerns over systemic fragilities and the risk of global negative spillovers, reminiscent of events like the 2008 financial downturn, persist.

Leveraging digital innovations in financial systems' advantages for sustainability becomes crucial. Technologies such as blockchain can enhance transpar-

ency in the financial sector and potentially set the stage for more accountable green investments. Fintech also impacts the social facets, notably by facilitating access to financial services for previously underserved communities. Simultaneously, fintech facilitates the emergence of territorial financial networks alongside traditional structures. This new landscape redefines the stakeholders within these ecosystems but also challenges the existing norms, making the trajectory toward sustainable financial networks.

This study relies on literature from the past decade and may not encapsulate earlier seminal works. Therefore, future research should expand the temporal scope and investigate the dynamic interplay between technological disruptions and sustainability within financial networks, aiming to provide a more comprehensive understanding of how technology disrupts traditional financial networks in the context of sustainability.

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Authors	Article Title	Publication Year	Technology			
			Centralisation	Complexity	Vulnerability	Globalisation
Banerjee & Guhathakurta	Change-point analysis in financial networks	2020			×	×
Jackson & Pernoud	Systemic Risk in Financial Networks: A Survey	2021	×		×	
Cui et al.	A Preliminary Survey of Analyzing Dynamic Time-Varying...	2018		×		
Wojcik et al.	Luxembourg and Ireland in global financial networks...	2022	×			×
Keller-Ressel & Nargang	The hyperbolic geometry of financial networks	2021		×		
Topfer	China's integration into the global financial system...	2018				×
Hemenway & Khanna	Sensitivity and computational complexity in financial networks	2016			×	
Mahmoud et al.	Hubs and Communities Identification in Dynamical...	2015		×		
Wegner	A note on liquidity policies and financial networks	2019			×	
Migozzi et al.	Urban Geographies of Financial Convergence...	2023	×			×
Caraiani & Lazarec	Using Entropy to Evaluate the Impact of Monetary Policy...	2021	×			
Kukreti et al.	A Perspective on Correlation-Based Financial Networks...	2020		×		
Li et al.	A Hybrid Approach for the Assessment of Risk Spillover ...	2023			×	
Castren & Kavonius	Sector-Level Financial Networks and Macroprudential...	2013			×	
Papana et al.	Financial networks based on Granger causality...	2017		×		×
Hall et al.	The changing spatial arrangements of global finance...	2023	×			×
Greenwood-Nimmo & Tarassow	Bootstrap-based probabilistic analysis of spillover scenarios...	2022			×	
Elliott et al.	Financial Networks and Contagion	2014			×	
Castren et al.	Digital currencies in financial networks	2022				×
Giraitis et al.	Estimating the Dynamics and Persistence of Financial Networks...	2016		×		

Authors	Article Title	Publication Year	Centralisation	Complexity	Vulnerability	Globalisation	Technology
li & Sui	Contagion risk in endogenous financial networks	2016		×			
Ross	Dynamic multifactor clustering of financial networks	2014		×		×	
Millington & Niranjani	Stability and similarity in financial networks – How do they change...	2021		×			
Bartasaghi et al.	Risk-Dependent Centrality in Economic and Financial Networks	2020	×				
Boersma et al.	Measure cross-sectoral structural similarities from financial...	2023	×				×
Nobi & Lee	Systemic risk and hierarchical transitions of financial networks	2017		×			
Kojaku et al.	Structural changes in the interbank market across the financial...	2018	×				
Hewapathirana	Change detection in dynamic attributed networks	2019					×
Gidea	Topological Data Analysis of Critical Transitions in Financial...	2017		×			
Wan & Arbad	Law of interest rate changes in financial markets...	2021					
Lee & Park	Measuring Global Financial Linkages...	2019	×			×	
Sun	Systemic risk and macro-financial contagion in China...	2023		×	×		
Manta et al.	The Architecture of Financial Networks and Models of Financial...	2020					
Balci et al.	Coarse Graining on Financial Correlation Networks	2022		×			
Kangogo et al.	Changing vulnerability in Asia: contagion and spillovers	2023			×	×	
Iliopoulos & Wojcik	The multiple faces of financialization...	2022	×				
Mandel et al.	Risks on global financial stability induced by climate change...	2021			×		
Ziolo et al.	Modeling the impact of external influence on green behaviour...	2022					
Grilli et al.	Business fluctuations in a behavioral switching model...	2020		×			
Robertson et al.	Global financial networks confront headwinds...	2021					

Authors		Article Title	Publication Year	Centralisation	Complexity	Vulnerability	Globalisation	Technology
McGrath et al.		The Architecture of the Metacity: Land Use Change...	2017		×			×
Ma et al.		Mutual fund net flows in China: A co-holding network perspective	2023					
Huser et al.		The systemic implications of bail-in...	2018		×	×		
Horstmeyer et al.		Predicting collapse of adaptive networked systems...	2020		×	×		
Akguller & Balci		Geodetic convex boundary curvatures of the communities ...	2018		×			
Cloke & Brown		Speaking in riddles: The Panama Papers and the global financial...	2019	×			×	
Egger et al.		The network and own effects of global-systemically-important...	2023		×	×	×	
Tabak et al.		Analysis of connectivity between the world's banking markets...	2022		×	×		
Xu & Corbett		What a network measure can tell us about financial...	2020		×		×	×
Goh & Lai		Financial Network Construction of a Set of Coupled Stochastics...	2019	×				×
Xie		Study on Network Financial Risk Factors...	2016					×
Goldman & Narayan		THROUGH THE OPTICS OF FINANCE...	2021				×	
Shen et al.		Sector connectedness in the Chinese stock markets	2022			×		
Squartini & Garlaschelli		Economic networks in and out of equilibrium	2013			×	×	
Kim et al.		Centralization of the Global REDD plus Financial Network...	2019	×			×	
Walters et al.		FINANCIAL CONTAGION IN LARGE, INHOMOGENEOUS...	2019		×			
Denbee et al.		Network risk and key players: A structural analysis of interbank...	2021		×	×		
Bai et al.		A Quantum-inspired Entropic Kernel for Multiple Financial Time...	2020					×
Cerqueti et al.		Systemic risk assessment through high order clustering...	2021	×		×		
Zhang et al.		LARGE MULTIPLE GRAPHICAL MODEL INFERENCE...	2020		×			

Authors		Article Title	Publication Year	Centralisation	Complexity	Vulnerability	Globalisation	Technology
Campiglio & van der Ploeg		Macrofinancial Risks of the Transition to a Low-Carbon Economy	2022			×		
Meyer		Shenzhen in China's Financial Center Networks	2016	×			×	
Yao et al.		Flow-Based Clustering on Directed Graphs...	2020		×			
Gao et al.		Dynamic Evolution of Financial Network...	2013		×			
Hall et al.		Inferring High-Dimensional Poisson...	2016		×			
Sen & Ma		Statistical Learning of Lattice Option Pricing...	2019		×			×
Wilson		The Village that Turned to Gold...	2016	×			×	
Wang et al.		Directed Graph Evolution from Euler-Lagrange Dynamics	2018		×			
Chen et al.		Solvency contagion risk in the Chinese commercial...	2021			×		
Nie		Studying the correlation structure based on market geometry	2021	×				
Viollaz et al.		Using script analysis to understand the financial crimes...	2018				×	
Lui & Szeto		Evolution of financial network through non-linear coupling...	2020	×	×			
Detering et al.		An integrated model for fire sales and default contagion	2021			×		
Ye et al.		An Iterative Approach to Reduce Systemic Risk among Financial...	2017		×	×		
Hendrikse et al.		Strategic coupling between finance, technology and the state...	2020				×	×
D'Orazio & Popoyan		Fostering green investments and tackling climate-related financial...	2019			×		
Yen & Cheong		Using Topological Data Analysis (TDA) and Persistent Homology...	2021					×
Giannakis et al.		Topology Identification and Learning Over Graphs...	2018	×				
Qiu et al.		Financial crisis prediction based on multilayer supervised network...	2022		×			×
Brandon		The whole art of war is reduced to money': remittances...	2018	×				

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Gancarczyk et al.	The fintech transformation of banking: Governance dynamics...	2022					×
Wang et al.	Optimization of Financial Network Stability by Genetic Algorithm	2017		×			
Monasterolo et al.	Vulnerable yet relevant: the two dimensions of climate-related...	2017				×	
Lavin et al.	Modeling Overlapped Mutual Funds' Portfolios: A Bipartite...	2019		×			
Puliga et al.	Credit Default Swaps networks and systemic risk	2014			×	×	
Sandhu et al.	Ricci curvature: An economic indicator for market fragility...	2016			×		
Zhang & Zhang	Dynamic credit contagion and aggregate loss in networks	2022		×			
Amini et al.	Optimal equity infusions in interbank networks	2017		×			
Lu et al.	Graphon-Inspired Analysis on the Fluctuation of the Chinese...	2016			×		
Dafermos et al.	FX swaps, shadow banks and the global dollar footprint	2023	×			×	
Diem et al.	Quantifying firm-level economic systemic risk from nation-wide...	2022		×			
Herskovic	Networks in Production: Asset Pricing Implications	2018		×			
Dungey et al.	Crisis transmission: Visualizing vulnerability	2020		×			×
Wu et al.	Estimating contagion mechanism in global equity market...	2023		×	×		

Appendix

Deciphering Global Financial Networks: A Decade of Research on Financial Network Dynamics