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Accepted for publication in European Business Law Review

Research Repository link: <https://repository.essex.ac.uk/42512/>

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<https://doi.org/10.54648/eulr2026026>

# Financial Stability at Stake: Decentralised Finance's Regulatory Challenges in a Changing Financial Landscape

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## Abstract

This article considers the potential of decentralised finance (DeFi) to disrupt global financial stability, highlighting its evolving vulnerabilities and emerging systemic risks. While DeFi has yet to trigger a financial crisis, its rapid growth, increasing complexity, and expanding interconnections with traditional finance (TradFi) suggest that it could become a channel for financial instability under stress conditions. While DeFi inherits certain vulnerabilities of TradFi, its reliance on decentralised governance, algorithmic execution, and volatile collateral arrangements generates distinct risk dynamics. The article places a critical emphasis on stablecoins, whose structural fragilities and liquidity mismatches may amplify contagion effects in times of market stress. The article also examines the limitations of built-in risk mitigation mechanisms, such as overcollateralization and automated liquidation, which, in the absence of legal safeguards or supervisory oversight, may not be sufficient to prevent market-wide disruptions. To mitigate the threat that DeFi may pose to financial stability, this article identifies two regulatory priorities: enhancing monitoring and supervision of DeFi's evolution and fostering international cooperation to mitigate transmission risks inherent in the DeFi ecosystem.

**Keywords:** Decentralised finance (DeFi), financial stability, systemic risk, stablecoins run, liquidity mismatch

## 1. Introduction

Decentralised finance (DeFi) has emerged as one of the most transformative developments in the financial sector. DeFi refers to financial applications operating on a permissionless blockchain, utilising smart contracts to automate the delivery of financial services without relying on intermediaries.<sup>1</sup> The deployment of smart contracts and the decentralised structure of platform operations and governance are the key features that set DeFi apart from centralised blockchain

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<sup>1</sup> The World Economic Forum, *Decentralized Finance: (DeFi) Policy-Maker Toolkit* (2021), <https://www.weforum.org/publications/decentralized-finance-defi-policy-maker-toolkit/>.

systems. DeFi has grown exponentially in the last decade, attracting significant attention from investors, developers, and policymakers.<sup>2</sup> The total value locked (TVL), which represents the aggregate value of assets deposited in DeFi services, surged from \$600 million on January 1, 2020, to a peak of approximately \$315 billion on December 26, 2021, marking an extraordinary growth of 524% in just two years.<sup>3</sup> The rapid growth of DeFi must also be situated within broader transformations in global finance. The growing role of data-driven infrastructures and the digitalisation of financial markets mean that DeFi is not an isolated phenomenon but an essential part of a wider restructuring of financial intermediation. This raises crucial questions about how law and regulation can adapt to technological disruption while maintaining financial stability as a global public good.

Despite its potential, DeFi introduces unique challenges and risks. One of the most pressing concerns is its potential impact on financial stability, a cornerstone objective of financial regulation. Financial stability is crucial for maintaining confidence in the financial system and supporting economic growth. The 2008 global financial crisis (GFC) demonstrated the devastating consequences of systemic risk and the fragility of interconnected financial systems, prompting regulators to prioritise stability as a primary regulatory objective. These measures were tailored to traditional finance. However, DeFi introduces new risks, including operational vulnerabilities, leverage, interconnectedness, and liquidity and maturity mismatches, which differ fundamentally from those associated with traditional financial systems. Although DeFi is often portrayed as able to work independently of traditional financial institutions and their regulatory safeguards, this claim is increasingly hard to sustain.<sup>4</sup> Even if DeFi protocols can operate autonomously, their inherent vulnerabilities may propagate within the DeFi ecosystem and, critically, spill over into traditional finance through growing interconnections. Therefore, DeFi's spillover risks expose the limits of traditional finance safeguards when applied to decentralised financial structures. This

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<sup>2</sup> Eurofi, *Decentralized Finance (DeFi): Opportunities, Challenges and Policy Implications* (2022), [https://www.eurofi.net/wp-content/uploads/2022/05/eurofi\\_decentralized-finance-defi\\_opportunities-challenges-and-policy-implications\\_paris\\_february-2022.pdf](https://www.eurofi.net/wp-content/uploads/2022/05/eurofi_decentralized-finance-defi_opportunities-challenges-and-policy-implications_paris_february-2022.pdf).

<sup>3</sup> European Commission, *Decentralized Finance: Information Frictions and Public Policies: Approaching The Regulation And Supervision of Decentralized Finance* (2022) [https://finance.ec.europa.eu/system/files/2022-10/finance-events-221021-report\\_en.pdf](https://finance.ec.europa.eu/system/files/2022-10/finance-events-221021-report_en.pdf).

<sup>4</sup> Grzegorz Sobiecki, Krzysztof Piech & Aleksandra Kopeć, *The Meaning of Decentralised Finance (DeFi)*, in Ranjan Aneja & Robert Dygas (eds) *Digital Currencies and the New Global Financial System* (Routledge, 2022).

raises important questions about DeFi's impact on financial stability and the regulatory challenges it poses.

In this context, financial stability is treated in this article not simply as a technical or prudential objective, but as a normative commitment rooted in the post-2008 global regulatory architecture, against which DeFi's risks must be evaluated. This framing highlights DeFi's vulnerabilities as challenges to the principles underpinning contemporary financial stability governance, rather than as isolated operational issues.

This article examines the potential of DeFi to disrupt the stability of the global financial system, highlighting its unique vulnerabilities and systemic risks. It also explores the profound regulatory challenges posed by DeFi's decentralised structure, demanding a rethinking of traditional frameworks to safeguard financial stability in an evolving digital landscape. To address these issues, the paper adopts a doctrinal methodology to analyse legal frameworks and regulatory approaches to DeFi. It also employs case studies, such as the collapse of Silicon Valley Bank and stablecoin runs, to illustrate systemic risks and their implications for financial stability.

The legal literature on DeFi remains limited, with most studies focusing on regulatory design or investor protection rather than systematically assessing its implications for financial stability and the associated legal challenges.<sup>5</sup> This leaves a critical gap in understanding how DeFi interacts with the stability mandate that has shaped global financial regulation since 2008. Unlike earlier scholarship,<sup>6</sup> which largely regarded DeFi as a minor threat due to its relatively small size, this article reorients the debate, arguing that DeFi's rapid evolution in scale and complexity, and its growing interconnections with the traditional financial system, mean that risks once considered

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<sup>5</sup> For example, Katrin Schuler, Ann Sofie Cloots and Fabian Schär, *On DeFi and On-Chain CeFi: How (Not) to Regulate Decentralized Finance* 10 J FINANC REGUL 213, 222 (2024); Dirk A. Zetsche, Douglas Arner & Ross Buckley, *Decentralized Finance* 6 J FINANC REGUL 172 195 (2020); Fabian Schär, *Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets* 103 Federal Reserve Bank of St. Louis Review 153, 164 (2021); Matteo Aquilina, Jon Frost & Andreas Schrimpf, *Decentralized Finance (DeFi): A Functional Approach* 10 J FINANC REGUL 1, 10 (2024); Agata Ferreira, *Decentralized finance (DeFi): The Ultimate Regulatory Frontier?* 19 Cap. Mark. Law J.242, 248 (2024).

<sup>6</sup> For example, Schuler, Cloots & Schär, *supra* n. 6; Aquilina, Frost & Schrimpf, *supra* n. 6; Felix Bekemeier, *Deceptive Assurance? A Conceptual View on Systemic Risk in Decentralized Finance (DeFi)* (2021) 4th International Conference on Blockchain Technology and Applications <https://dl.acm.org/doi/fullHtml/10.1145/3510487.3510499> accessed 8 November 2024.

peripheral may now pose systemic threats. By developing a framework linking DeFi's vulnerabilities with the evolution of financial stability governance, the article contributes an original perspective to financial law and transnational regulatory scholarship. While DeFi has yet to trigger a systemic crisis, increasing scale and institutional exposure suggest that vulnerabilities could propagate into the wider system. History shows even minor disruptions, such as the subprime mortgage market in 2008, can escalate into global crises, highlighting the need for early risk assessment.<sup>7</sup>

While the methods employed by DeFi to provide financial services are often innovative, this paper asserts that the fundamental functions it performs are largely similar to those of traditional finance (TradFi). By mirroring elements of the traditional financial system, DeFi inherits many long-recognized vulnerabilities. However, the distinct features of DeFi can cause these vulnerabilities to emerge in novel ways, giving rise to new risks and unpredictable outcomes. Despite successful protocol-level resolution mechanisms, these operate in a volatile environment with limited legal and regulatory oversight, which may not suffice under extreme market-wide stress.

Building on the premise that DeFi's systemic risks are novel and evolving, this paper examines how the growing interconnectedness between DeFi and traditional finance (TradFi) amplifies these vulnerabilities, rendering financial stability susceptible to disruption. As the extent to which DeFi threatens financial stability depends on the degree of interconnectedness and the transmission channels linking DeFi and TradFi, the paper raises a question concerning the nature and depth of this interconnectedness. To address this issue, it identifies two forms of interconnectedness capable of undermining financial stability: interconnectedness within the DeFi ecosystem itself and interconnectedness linking DeFi to TradFi. The analysis demonstrates that complex dependencies among DeFi platforms and protocols can propagate shocks and generate instability, particularly in the absence of robust safeguards. It further shows that DeFi–TradFi interconnectedness is intensifying due to increased institutional participation and the extensive use of stablecoins.<sup>8</sup> The

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<sup>7</sup> Philip Arestis & Elias Karakitsos, *Subprime Mortgage Market and Current Financial Crisis* (2009) Cambridge Centre for Economic and Public Policy, <https://www.landecon.cam.ac.uk/sites/default/files/2023-03/wp08-09.pdf>.

<sup>8</sup> Chainalysis, *The 2021 Global Crypto Adoption Index: Worldwide Adoption Jumps Over 880% With P2P Platforms Driving Cryptocurrency Usage in Emerging Markets* (2021) <https://www.chainalysis.com/blog/2021-global-crypto-adoption-index/>.

collapse of Silicon Valley Bank (SVB) highlights these linkages and challenges assumptions that DeFi operates independently of traditional markets.

A critical component of DeFi–TradFi interconnectedness is the role of stablecoins, which act as a bridge between the two systems while introducing their own systemic vulnerabilities. This paper explores this connection by analysing stablecoin runs, which may pose systemic risk to the broader financial system. Stablecoins are cryptocurrencies designed to maintain a stable value by pegging their worth to specific assets, such as fiat currencies or other cryptocurrencies.<sup>9</sup> They are integral to DeFi, enabling asset transfers within platforms and between DeFi and TradFi systems. Building on strategic run theory (Section 5), the article demonstrates how runs on stablecoins could trigger contagion, spreading across stablecoins and financial institutions with similar risk profiles, potentially escalating into systemic risk without robust prudential safeguards.<sup>10</sup> It compares stablecoin run-risks with 2008 money market fund runs that heightened systemic risk.<sup>11</sup> Unlike much scholarly discussion treating all stablecoins as a single category, this article argues that run triggers vary by stablecoin type, depending on reserve assets, collateral systems, and operational frameworks. While over-collateralisation mitigates individual liquidations, it does not fully insulate the system from financial stability risks amid growing DeFi–TradFi links.

Although this paper does not delve into the broader debate on whether and how DeFi should be regulated, it identifies two key regulatory priorities to mitigate DeFi’s potential threat to financial stability: effective monitoring and supervision of its rapid development, and fostering international cooperation. This focus allows the paper to address the most pressing issues directly linked to financial stability rather than broader regulatory controversies. Monitoring DeFi’s growth is essential for identifying emerging risks before they escalate into systemic instability. This article explores challenges to effective monitoring, proposing that embedding regulatory tools within DeFi’s technological framework could strengthen oversight and supervision. It highlights a critical

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<sup>9</sup> Douglas Arner, Raphael Auer & Jon Frost, *Stablecoins: Risks, Potential and Regulation* (2020) BIS Working Papers No 905, <https://www.bis.org/publ/work905.pdf>.

<sup>10</sup> Douglas Diamond & Philip Dybvig, *Bank Runs, Deposit Insurance, and Liquidity* 91 J. Political Econ. 401, 41 (1983).

<sup>11</sup> Mohammed K. Alshaleel, *Money Market Funds Reforms in the US and the EU: The Quest for Financial Stability* 31 EBLR 303, 320 (2020).

opportunity in utilising Regulatory Technology (RegTech),<sup>12</sup> which involves leveraging technology to enhance regulatory compliance, oversight, and the design of financial systems and infrastructure. Further, given DeFi's inherently cross-border nature, the paper emphasises the necessity of international cooperation to mitigate its systemic risks and ensure coordinated regulatory responses capable of addressing threats that transcend national boundaries.

The article is structured as follows. Part 2 delves into financial stability as a core regulatory objective, emphasising systemic risk, the potential for disruptions to spread across markets, institutions, and economies, causing significant economic harm. Part 3 explains the defining characteristics and structural differences between TradFi and DeFi, highlighting the pivotal role of stablecoins within the DeFi ecosystem. Building on this, Part 4 examines DeFi's vulnerabilities and implications for financial stability, focusing on risks from its growing interconnectedness with TradFi, including leverage and liquidity risks, and technological and operational risk. Part 5 analyses liquidity mismatch and stablecoin runs. Part 6 addresses regulatory challenges, identifying two priorities: effective monitoring and supervision of DeFi's rapid evolution and fostering international cooperation. Part 7 concludes by emphasising proactive oversight and collaboration to mitigate DeFi risks while preserving innovation and ensuring the resilience of the financial system.

## **2. Financial Stability and Systemic Risk**

In order to effectively examine the potential impact of DeFi on financial stability, it is crucial to first establish a clear understanding of the concepts of financial stability and systemic risk. By defining these concepts, this section lays the groundwork for the subsequent discussion in Section 4, which will explore how DeFi introduces new dimensions of systemic risk and its implications for maintaining global financial stability.

Although financial systems differ across countries based on their economic development, government structure, and policy orientation, policymakers generally agree upon three primary objectives of financial regulation: (1) protecting investors; (2) ensuring that markets are fair,

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<sup>12</sup> Fabian Teichmann, Sonia Boticiu & Bruno S. Sergi, *RegTech – Potential Benefits and Challenges for Businesses* 73 TECHNOL SOC 1, 3 (2023).

efficient, and transparent; and (3) safeguarding the stability of the financial system.<sup>13</sup> These objectives are interconnected and sometimes overlap. For instance, regulations designed to create efficient and transparent markets can simultaneously protect investors and reduce systemic risk. Similarly, measures that mitigate systemic risk can also contribute to investor protection. Since this article focuses on the impact of DeFi on financial stability, it is significant to examine the concept of financial stability and define its core elements.

### *2.1 Defining Financial Stability*

Due to its complexity and multi-dimensional nature, there is, as yet, no widely accepted agreement on the concept and substance of financial stability, and the understanding of the term has continuously evolved and been shaped by financial crises and changes over time.<sup>14</sup> It is important to note that the financial system and associated risks are continually evolving due to technological progress, economic shifts, and the introduction of new financial instruments.<sup>15</sup> This makes it challenging for lawmakers to create a concept that not only adheres to the rule of law but also allows for the flexibility needed for effective legal interpretation and enforcement. Chiu and Andenas opine that, while financial stability is a protean concept that could encompass socio-political considerations within a democratic context, regulators are likely to focus on a narrower view of financial stability in most post-global financial crisis reforms.<sup>16</sup> While this approach may create more objective certainty regarding regulatory responsibility, it could also result in regulatory practices that do not fully align with serving the broader public interest.

In the legal literature, attempts to define financial stability vary significantly, each taking a different approach and emphasising distinct aspects or perspectives of the concept. While some scholars focus on defining financial instability, others aim to clarify the concept of financial stability. Mishkin, for example, noted that '*financial instability occurs when shocks to the financial system interfere with information flow so that the financial system can no longer do its job of*

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<sup>13</sup> Mohammed Khair Alshaleel, *Regulation and Governance of Mutual Funds: United Kingdom and United States of America Perspectives on Investor Protection* 64 (Routledge, 2022).

<sup>14</sup> Alshaleel (n 12).

<sup>15</sup> János Kálmán, *The Concept of Financial Stability in Theory and Law* 22 *Rev. Financ. Econ.* 54. 65 (2023).

<sup>16</sup> Mads Andenas & Iris H-Y Chiu, *The Foundations and Future of Financial Regulation: Governance for Responsibility* 30 (Taylor & Francis 2013).

*channeling funds to those with productive investment opportunities*'.<sup>17</sup> Chant described financial instability as '*...conditions in financial markets that harm or threaten to harm an economy's performance through their impact on the working of the financial system*'.<sup>18</sup> The definition implies that financial instability should be analysed by considering how shifts in financial conditions might affect the real economy. Crockett highlighted that maintaining financial stability requires '*that the key institutions in the financial system are stable, in that there is a high degree of confidence that they continue to meet their contractual obligations without interruption or outside assistance; and that the key markets are stable*'.<sup>19</sup> Despite the variation among these and many other definitions, several common elements can be identified. In many efforts to define the concept of financial stability, authors often reference the roles, functions and core components (financial institutions, markets and infrastructure) of the financial system. Additionally, several definitions explicitly recognize the possible adverse effects of financial instability on the real economy, emphasising that disruptions in the financial system can spread through various sectors, leading to reduced economic growth, higher unemployment, and overall economic distress.

This paper adopts the definition of financial stability provided by the European Central Bank (ECB). The choice of the ECB is deliberate, as it functions not only as a central bank but also as a principal prudential and macroprudential regulatory authority covering 27 EU Member States, explicitly mandated to safeguard financial stability across a highly integrated financial system. The ECB defines financial stability as:

A condition in which the financial system – comprising of financial intermediaries, markets and market infrastructures – is capable of withstanding shocks and the unraveling of financial imbalances, thereby mitigating the likelihood of disruptions in the financial intermediation process which are severe enough to significantly impair the allocation of savings to profitable investment opportunities.<sup>20</sup>

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<sup>17</sup> Frederic Mishkin, *Global Financial Instability: Framework, Events* 13 JEP 3, 12 (1999).

<sup>18</sup> John Chant, *Financial Stability as a Policy Goal, in Essays on Financial Stability*, Technical Report No. 95, (Bank of Canada 2003) <https://www.banqueducanada.ca/wp-content/uploads/2010/01/tr95.pdf>.

<sup>19</sup> Andrew Crockett, *Why is Financial Stability a Goal of Public Policy?* 82 Econ. Rev. 7, 15 (1997).

<sup>20</sup> European Central Bank, *Financial Stability Review* (2012) <https://www.ecb.europa.eu/pub/pdf/fsr/financialstabilityreview201212en.pdf>.

The ECB's definition is significant as it emphasizes that financial stability is a comprehensive concept, covering the three fundamental components of the financial system: financial institutions, markets, and infrastructure. This system-wide perspective is especially important for analysing DeFi, which undertakes core financial intermediation functions while operating across institutional, market, and infrastructural layers, often outside the perimeter of traditional banking regulation. Given the strong interconnections among these elements, expectations of disturbances in any of them can influence the stability of the entire system. For instance, disturbances might initially emerge within a single institution and then gradually spread to other parts of the financial system. Therefore, adopting the ECB's framework provides an analytically appropriate benchmark for assessing financial stability risks arising from functional similarity and growing interconnectedness with TradFi.

## 2.2 Defining Systemic Risk

Systemic risk is at the core of financial stability, representing the potential for disruptions within the financial system to spread widely and cause significant economic harm. The concept has been discussed across a wide interdisciplinary literature in economics, finance, and law, with contributions ranging from network-based and quantitative models to institutional and regulatory analyses. However, this substantial body of work remains fragmented, shaped by differing disciplinary perspectives and regulatory objectives. Despite the fact the term “*Systemic risk*” is widely used, it remains challenging to clearly define and quantify.<sup>21</sup> A literature review on systemic risk by Galati and Moessner concludes that, despite extensive research on the topic, there is still no consensus on the definition of systemic risk.<sup>22</sup> Their contribution is widely recognised as foundational because it synthesises the main strands of the economic literature and emphasises ongoing conceptual disagreements. Similar to financial stability, there are numerous definitions of systemic risk. Zigrand suggests that systemic risk involves both the risk to the system's proper functioning and the risk generated by the system itself.<sup>23</sup> This definition is specifically influential because it captures both exogenous shocks and endogenous amplification mechanisms, which are

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<sup>21</sup> International Monetary Fund, *Responding to the Financial Crisis and Measuring Systemic Risks* (2009) <http://www.imf.org/external/pubs/ft/gfsr/2009/01/>.

<sup>22</sup> Gabriele Galati & Richhild Moessner, *Macprudential Policy - A Literature Review* (2011) BIS Working Papers No 337 <https://www.bis.org/publ/work337.pdf>.

<sup>23</sup> Jean-Pierre Zigrand, *Systems and Systemic Risk in Finance and Economics*. SRC Special Paper No 1 <https://core.ac.uk/download/pdf/35434681.pdf>.

pivotal to contemporary studies of financial crises. These two risks can intersect, where a shock originating within the system and amplified by it can result in the auto-destruction of significant parts of the system or even the collapse of the entire system. Oosterloo and de Haan's reviews conclude that systemic risk evolves along with the development of financial markets, regulatory frameworks, and the collective behaviour of market participants.<sup>24</sup> Their contribution represents a regulatory and policy-oriented stream of the literature, highlighting the dynamic relationship between innovation, regulation, and risk accumulation. They suggest that regulatory arbitrage can trigger systemic risk, as it enables institutions to exploit gaps or inconsistencies in regulations, potentially leading to increased risk-taking, weak oversight, and vulnerabilities that can spread throughout the financial system.

Interestingly, in the EU, the normative definition of financial stability can be understood through the lens of systemic risk. Systemic risk is described as the risk of disruption within the financial system that has the potential to cause serious negative impacts on both the internal market and the real economy.<sup>25</sup> Although the regulation that created the European Systemic Risk Board (ESRB) does not explicitly define financial stability, it contains several references and guidelines concerning its essential components.<sup>26</sup> The ESRB was established to oversee the EU's financial system, with the primary goal of preventing and mitigating systemic risk.

A key aspect of systemic risk is the transmission of shocks (disturbances) between interconnected components of the financial system, which may ultimately have a negative impact on the economy.<sup>27</sup> When one part of the financial system experiences stress, such as a bank facing solvency issues or a market experiencing a sharp decline, the impact can spread through other parts of the system. This interconnected nature amplifies vulnerabilities, as problems in one institution

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<sup>24</sup> Sander Oosterloo & Jakob de Haan, *A Survey of Institutional Frameworks for Financial Stability*. Occasional Studies (2003) Vol.1/Nr.4, De Nederlandsche Bank [https://www.dnb.nl/media/2itnjniw/200311\\_04-a\\_survey\\_of\\_institutional\\_frameworks\\_for\\_financial\\_stability.pdf](https://www.dnb.nl/media/2itnjniw/200311_04-a_survey_of_institutional_frameworks_for_financial_stability.pdf).

<sup>25</sup> Regulation (EU) No 1092/2010 of the European Parliament and of the Council of 24 November 2010 on European Union Macro-Prudential Oversight of the Financial System and Establishing a European Systemic Risk Board, OJ L 331, art 2 (c).

<sup>26</sup> Kálmán, *supra* n. 59.

<sup>27</sup> Frederic S. Mishkin, *The Causes and Propagation of Financial Instability: Lessons for Policymakers*. Occasional Studies (1997) Federal Reserve Bank of Kansas City <https://www.kansascityfed.org/documents/3591/pdfs97Mishk.pdf>.

or sector can quickly escalate into a broader crisis (contagion), threatening the stability of the entire financial network. As will be discussed later, DeFi has the potential to contribute to systemic risk to the financial system by increasing interconnectedness, which can threaten overall financial stability. This interconnected nature of DeFi platforms and traditional financial institutions can amplify vulnerabilities and lead to widespread disruptions.

The concepts of financial stability and systemic risk provide the analytical framework for evaluating DeFi's impact on the financial system. Building on this foundation, the following sections clarify what DeFi is, and is not, when compared to traditional finance, identify its main vulnerabilities, and analyse how interconnectedness both within the DeFi ecosystem and between DeFi and traditional financial institutions may act as a key channel through which systemic risk can emerge and propagate.

### **3. Decentralised Finance and Traditional Finance: Structure and Regulatory Perimeter**

This section examines the structural relationship between DeFi and TradFi. It shows that, while DeFi replicates various key financial functions traditionally performed by regulated financial institutions, such as intermediation, liquidity provision, and maturity transformation, it relies on fundamentally different technological architectures and operates largely outside the established institutional and regulatory framework governing TradFi. By defining TradFi, comparing it with DeFi, and analysing the pivotal role of stablecoins alongside the Basel standards on cryptoassets, this section clarifies how functional similarity coexists with regulatory and structural divergence, thereby laying the foundation for assessing DeFi's financial stability implications.

#### *3.1 Defining Traditional Finance*

Traditional finance is defined by the presence of main intermediaries that consolidate various functions and financial resources. A robust and efficient financial system's primary objective is to facilitate resource allocation to support real economic activities in the presence of risk and uncertainty.<sup>28</sup> To achieve this goal, the financial system performs several interconnected functions: it facilitates payments for goods, services, and money transfers; enables the pooling of funds for

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<sup>28</sup> The Financial Stability Board, *The Financial Stability Risks of Decentralised Finance* (2023) <https://www.fsb.org/2023/02/the-financial-stability-risks-of-decentralised-finance/>.

large projects; allows the transfer of resources over time and space; helps manage uncertainty and control risk; offers price information for decentralised decision-making; and reduces information asymmetries and incentive problems that arise when one party has more information than another.<sup>29</sup> Intermediaries like banks play a crucial role in connecting diverse participants, ensuring that the capital from savers, lenders, and investors meets the needs of borrowers and entrepreneurs. Zetzsche and others opine that '*traditional finance results in the hub-and-spoke conceptualisation of finance and financial centres*'.<sup>30</sup> Although customers can locally access financial services such as payments, insurance, savings, and investments, these services are generally not offered directly at the point of access. Instead, financial markets and activities have traditionally been concentrated in local, regional, and large-scale global centres or hubs.<sup>31</sup> These financial centres have developed distinct local, regional, and global functions and importance. For example, while New York and London offer investment banking services worldwide, Luxembourg is recognized as the global hub for investment funds.

Importantly, financial centres rely on trust and confidence for their operations, which are supported by legal frameworks such as rules, regulations, and judicial systems.<sup>32</sup> While self-regulatory frameworks initially dominated, the state's role increased as these approaches failed, leading to various financial crises. Consequently, market-based financial systems are often viewed as inherently unstable, with regulations implemented in response to crises and market failures, though these measures are not always fully effective.<sup>33</sup>

This vulnerability highlights the fundamental idea behind DeFi and its vision of a financial system free from the control of centralised intermediaries and their inherent weaknesses, and the limitations of government and regulatory frameworks. Originally, DeFi envisioned a completely decentralised financial system without relying on traditional structures.<sup>34</sup> Nonetheless, as DeFi has

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<sup>29</sup> Ibid.

<sup>30</sup> Zetzsche, Arner & Buckley, *supra* n. 6.

<sup>31</sup> Douglas W Arner, *The Competition of International Financial Centres and the Rule of Law* in Karl Meesen (ed), *Economic Law as an Economic Good* 203 (Sellier 2009).

<sup>32</sup> Douglas W Arner, *Financial Stability, Economic Growth and the Role of Law* 15 (Cambridge University Press, 2007).

<sup>33</sup> Ibid 55.

<sup>34</sup> Bank for International Settlements, *Cryptocurrencies and Decentralised Finance (DeFi)* (2022) <https://www.bis.org/publ/work1061.htm>.

evolved, it has transitioned to a more practical approach where technology aims to replace deficient human institutions, addressing and potentially removing the risks associated with traditional financial systems.<sup>35</sup>

### 3.2 Decentralised Finance: Reimagining Finance

Understanding the characteristics and structure of DeFi is crucial to grasp its transformative potential and the distinctive challenges it poses to the global financial system. Examining its unique features provides a foundation for analysing DeFi's implications and helps distinguish its innovations and risks from those of traditional financial systems. DeFi is one of the fastest-growing sectors within the cryptocurrency and blockchain ecosystem. Because a universally accepted definition of DeFi has not yet been established, the definition of DeFi differs according to the goals, perceptions, and perspectives of various stakeholders, including policymakers, regulators and academics.<sup>36</sup> DeFi is an umbrella term that commonly refers to the provision of financial products, services, activities, and arrangements that use distributed ledger technology (DLT), aiming to replace traditional financial intermediaries and centralised institutions.<sup>37</sup> It is designed to replicate some of the functionalities of centralised finance (CeFi), which refers to traditional financial systems that rely on centralised intermediaries like banks and financial institutions to facilitate activities such as lending and borrowing, insurance, spot trading, and asset exchange.<sup>38</sup>

Historically, intermediaries have been crucial in financial markets, acting as agents and brokers to provide trust, liquidity and security.<sup>39</sup> Over time, their roles and importance have expanded to address the growing complexity of the financial system. Since the GFC of 2008, there has been an

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<sup>35</sup> Zetzsche, Arner & Buckley, supra n. 6.

<sup>36</sup> European Central Bank, *Decentralised Finance – A New Unregulated Non-Bank System?* (2022) [<sup>37</sup> The World Economic Forum, supra n. 1.](https://www.ecb.europa.eu/press/financial-stability-publications/macprudential-bulletin/focus/2022/html/ecb.mpbu202207_focus1.en.html#:~:text=While%20there%20is%20no%20generally,WorId%20Economic%20Forum%20(2021); Grzegorz Sobiecki, Krzysztof Piech & Aleksandra Kopeć, <i>The Meaning of Decentralised Finance (DeFi)</i>, in Ranjan Aneja & Robert Dygas (eds) <i>Digital Currencies and the New Global Financial System</i> (Routledge, 2022); Campbell R. Harvey, Ashwin Ramachandran & Joey Santoro, <i>DeFi and the Future of Finance</i> 16 (Wiley, 2021).</p></div><div data-bbox=)

<sup>38</sup> Aina Turillazzi et al, *Decentralised Finance (DeFi): A Critical Review of Related Risks and Regulation* (2023) <https://ssrn.com/abstract=4593242>.

<sup>39</sup> Harold L. Cole, *Finance and Financial Intermediation: A Modern Treatment of Money, Credit, and Banking* 154 (Oxford University Press, 2019).

increased focus on the inefficiencies, structural inequalities, and risks inherent in the traditional intermediated financial system.<sup>40</sup> DeFi services typically operate without centralised intermediaries, relying instead on blockchain technology and smart contracts to facilitate financial transactions and services. By eliminating intermediaries, DeFi aims to provide a more transparent, efficient, and accessible financial ecosystem. Transparency is enhanced through the use of open-source protocols and publicly verifiable transaction records on blockchain networks.<sup>41</sup> This ensures accountability and reduces the risk of fraud or manipulation. Efficiency is achieved by automating processes through smart contracts, which streamline transactions, eliminate the need for manual intervention and reduce operational costs.<sup>42</sup> Further, DeFi fosters accessibility by providing financial services to individuals and businesses without requiring traditional prerequisites such as credit histories or bank accounts.<sup>43</sup> This promotes greater financial inclusion. DeFi also has the potential to address longstanding inefficiencies in transaction settlement, such as uncertainties, delays, and failures, by facilitating rapid and reliable transactions across a decentralised network.<sup>44</sup> To understand how DeFi achieves these benefits and operates efficiently, it is significant to examine the underlying technical framework that supports its functionality and distinguishes it from traditional finance.

From a technological perspective, DeFi involves a multi-layered structure, often referred to as the “DeFi stack” which includes permissionless blockchains, smart contracts, DeFi protocols, and decentralised applications (DApps).<sup>45</sup> The foundational, or “settlement” layer, consists of a permissionless blockchain where transactions are permanently recorded and become immutable.<sup>46</sup> A blockchain is a digital ledger or database that takes a number of records and puts them in a

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<sup>40</sup> Y. V. Reddy, Financial Crisis and Financial Intermediation: Asking Different Questions in International Monetary Fund (eds) *In the Wake of the Crisis Leading Economists Reassess Economic Policy: Leading Economists Reassess Economic Policy* 83 (The MIT Press, 2012).

<sup>41</sup> Raunak Bhatt, *Decentralizing the Future* 112 (The Write Order Publication, 2024).

<sup>42</sup> Andrea Stazi, *Smart Contracts and Comparative Law* 76 (Springer, 2022).

<sup>43</sup> Organisation for Economic Co-operation and Development, *The Limits of DeFi for Financial Inclusion* (2024) [https://www.oecd.org/en/publications/the-limits-of-defi-for-financial-inclusion\\_f00a0c7f-en.html](https://www.oecd.org/en/publications/the-limits-of-defi-for-financial-inclusion_f00a0c7f-en.html).

<sup>44</sup> Nipun Agarwal et al, *Blockchain Application to Financial Market Clearing and Settlement Systems* 16 JRFM 452, 460 (2023).

<sup>45</sup> Kenneth Bok, *Decentralizing Finance: How DeFi, Digital Assets, and Distributed Ledger Technology Are Transforming Finance* 16 (Wiley, 2024).

<sup>46</sup> International Organization of Securities Commissions, *IOSCO Decentralized Finance Report* (2022) <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD699.pdf>.

block.<sup>47</sup> Each block represents data added to the ledger after reaching a consensus.<sup>48</sup> Once integrated into the chain, it cannot be altered. Every time a new block is added to the blockchain, it is timestamped: each block contains a cryptographic hash, a distinct cryptographic fingerprint, of the previous block.<sup>49</sup> Entries in the blockchain are immutable, ensuring that blocks cannot be altered or removed.<sup>50</sup> On top of this settlement layer lies the application layer, which consists of smart contracts-enabled applications.<sup>51</sup>

Smart contracts are an ancillary aspect of blockchain. A smart contract is a self-executing software program that automatically performs a function, such as processing a payment, on the occurrence of a certain event.<sup>52</sup> However, there is no clear and accepted legal definition of a smart contract. The concept of a smart contract was originally introduced by Nick Szabo in 1994 who defined it as ‘*a set of promises, specified in digital form, including protocols within which the parties perform on these promises*’.<sup>53</sup> While smart contracts can function entirely separate from blockchain, the emergence of blockchain has enabled smart contracts to come back to the centre of development and innovation. It is significant to note that the conditions, terms, and standards by which services and products are offered are set out in DeFi protocols. A protocol is a standardized set of rules that enables computers to format, process, and transmit data.<sup>54</sup> Most protocols are permissionless and can be used by anyone, whether anonymously or under a pseudonym, provided they have the necessary equipment and expertise, with minimal, if any, onboarding checks.<sup>55</sup>

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<sup>47</sup> Mohammed Khair Alshaleel, *Digitalizing the End-to-End International Trade Finance Process and the Law: A Mission for the Entire Ecosystem* 35 EBLR 49, 55 (2024).

<sup>48</sup> IOSCO, *IOSCO Research Report on Financial Technologies (Fintech)* (2017) <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD554.pdf>.

<sup>49</sup> Ravi Sarathy, *Enterprise Strategy for Blockchain: Lessons in Disruption from Fintech, Supply Chains, and Consumer Industries* 84 (MIT Press, 2022).

<sup>50</sup> Although blockchain is commonly viewed as immutable by design, it is not completely immune to change. Changes can occur in certain situations, such as changes to the consensus protocol, software bugs, or a majority of participants agreeing to alter the blockchain's rules. While these situations are uncommon and demand substantial consensus, they demonstrate that absolute immutability in blockchain is not fully guaranteed.

<sup>51</sup> International Organization of Securities Commissions, *supra* n. 24.

<sup>52</sup> Jelena Madir, *Smart Contracts* in Jelena Madir (ed), *Fintech: Law and Regulation* 175 (2<sup>nd</sup> edn, Edward Elgar Publishing Limited, 2021).

<sup>53</sup> Nick Szabo, *Smart Contracts* (1994)

<https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html>.

<sup>54</sup> Cordelia Friesendorf & Alena Blütener, *Decentralized Finance (DeFi) How Decentralized Applications (dApps) Disrupt Banking* 31 (Springer Cham, 2023).

<sup>55</sup> *Ibid* 31.

A third layer comprises web or mobile device applications (DApps) that offer user-friendly interfaces, allowing users to access DeFi products and services through their computers or smartphones.<sup>56</sup> It is important to mention that the terms “*protocol*” and “*DApp*” are often used interchangeably, referring to the protocol itself or the user interface. Further, this multi-layered technological structure is a critical aspect of DeFi, as it facilitates interoperability and composability: different protocols can seamlessly interact and integrate in various combinations. Because of their composability, DApps are sometimes referred to as Lego blocks.<sup>57</sup>

The above comparison between TradFi and DeFi demonstrates the fundamental differences in their structure and operations, particularly in terms of risk and governance. A key element in understanding the dynamics of DeFi is the role of stablecoins, which serve as a bridge between these two systems and play a pivotal role in driving DeFi’s growth and stability.

### *3.3 The Pivotal Role of Stablecoins In The Defi Ecosystem*

Cryptocurrency is at the heart of the DeFi ecosystem, serving as both a medium of exchange and a foundational asset for a wide range of financial activities such as lending, borrowing, trading, and investing.<sup>58</sup> Based on their stability and purpose, cryptocurrencies can be broadly categorized into stablecoins and non-stablecoins. The latter involves cryptocurrencies that do not have a stable value.<sup>59</sup> This category includes the early generation of cryptocurrencies such as Bitcoin and Litecoin. These cryptocurrencies are typically more volatile, and their value fluctuates widely based on market demand, investor sentiment, speculation, and other factors.<sup>60</sup> A stablecoin is generally a cryptocurrency that aims to maintain a stable value relative to a specific asset or basket of assets.<sup>61</sup> Stablecoins are a key element of DeFi, playing a significant role in its rapid and continuing growth. They facilitate the transfer of assets between and among traditional finance

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<sup>56</sup> Ferreira, supra n. 6.

<sup>57</sup> Friesendorf & Blütener supra, n. 32, 30.

<sup>58</sup> Parma Bains et al, *Regulating the Crypto Ecosystem: The Case of Stablecoins and Arrangements* 22 (International Monetary Fund, 2022).

<sup>59</sup> Igor Makarov & Antoinette Schoar, *Cryptocurrencies and Decentralised Finance (DeFi)* (2022) BIS Working Papers No 1061 <https://www.bis.org/publ/work1061.htm>.

<sup>60</sup> Robin Huang, Hui Dengb & Aiden Chan, *The Legal Nature of Cryptocurrency as Property: Accounting And Taxation Implications* 51 CLSR 1, 10 (2023).

<sup>61</sup> The Financial Stability Board, Regulation, Supervision and Oversight of “Global Stablecoin” Arrangements (2020) <https://www.fsb.org/wp-content/uploads/P131020-3.pdf>.

(TradFi) and DeFi platforms and protocols, while also driving the development of new DeFi products and services.<sup>62</sup>

Stablecoins were developed to address the high price fluctuations of non-stablecoins such as bitcoin. While some stablecoins peg their value to national fiat currencies like the U.S. dollar, others are linked to assets such as precious metals, short-term corporate debt, or even other cryptocurrencies.<sup>63</sup> The peg refers to the ratio at which a stablecoin is linked to its underlying reference asset.<sup>64</sup> Typically, the stablecoin issuer establishes a reserve account with a traditional bank, where the reserve assets (or collateral) are held, against which stablecoin holdings can be redeemed. At the beginning of 2021, the total market value of all stablecoins stood at \$30 billion, but by February 2022, it had surged to \$180 billion.<sup>65</sup> To put this in perspective, the total value of British Pound banknotes in circulation is approximately £82 billion.<sup>66</sup> The rapid growth of the stablecoin market emphasises their increasing significance within the financial ecosystem. This requires a deeper understanding of their operational frameworks and underlying mechanisms. Exploring their categorisation into different types provides valuable insight into their varying structures and the degree to which they align with the principles of decentralisation inherent in DeFi, and their differing impacts on financial stability, particularly in terms of run risks.

Generally, stablecoins can be categorized into three types: custodial stablecoins, asset-backed stablecoins, and algorithmic stablecoins. Custodial or centralised stablecoins rely on high-quality assets or fiat currency reserves to maintain their value.<sup>67</sup> These stablecoins are not considered DeFi instruments because they depend on the trust placed in a custodian to manage and maintain their

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<sup>62</sup> European Central Bank, *Stablecoins' Role in Crypto and Beyond Functions, Risks and Policy* (2022) [https://www.ecb.europa.eu/press/financial-stability-publications/macprudential-bulletin/html/ecb.mpbu202207\\_2~836f682ed7.en.html](https://www.ecb.europa.eu/press/financial-stability-publications/macprudential-bulletin/html/ecb.mpbu202207_2~836f682ed7.en.html).

<sup>63</sup> South African Reserve Bank, *The Financial Stability Considerations of Stablecoins In South Africa* (2023) <https://www.resbank.co.za/content/dam/sarb/what-we-do/financial-stability/The%20financial%20stability%20considerations%20of%20stablecoins.pdf>.

<sup>64</sup> Ibid.

<sup>65</sup> Makarov & Schoar, *supra* n. 45.

<sup>66</sup> Bank of England, *Our Banknote Statistics* (2024) <https://www.bankofengland.co.uk/statistics/banknote#:~:text=There%20are%20over%204.6%20billion,worth%20about%20C2%A382%20billion.>

<sup>67</sup> Brendan McGurk & Stefan Reichenbach, *Financial Services Law and Distributed Ledger Technology: Regulating Cryptoassets and Decentralised Finance* 54 (Edward Elgar Publishing Limited, 2024).

stability. An example of a custodial stablecoin is Diem, which was proposed by Facebook as a stablecoin. Although custodial stablecoins are not DeFi instruments, they can still be integrated into DeFi services. Asset-backed stablecoins utilize smart contracts to manage and liquidate collateral, which is held in the form of cryptocurrencies or other assets.<sup>68</sup> Algorithmic stablecoins are not backed by any collateral. Rather, they use algorithms and smart contracts to manage the supply of the stablecoin, increasing or decreasing it as needed to maintain a stable value.<sup>69</sup> For instance, TerraUSD was an algorithmic stablecoin pegged to the US dollar, but not backed by any assets. Its value was maintained through its connection with Luna (LUNA), the "native asset" of the Terra blockchain.<sup>70</sup> Since they function on a non-custodial and decentralised basis, asset-backed and algorithmic stablecoins are considered DeFi services. This article, as will be discussed in Section 4, argues that stablecoins have the potential to pose risks to financial stability by creating liquidity mismatches within DeFi systems. By facilitating high levels of borrowing and lending without sufficient safeguards, stablecoins may amplify vulnerabilities in the financial system. It will show that the stability of stablecoins is essential for the broader financial stability of the DeFi ecosystem.

### *3.4 The Basel Standards on Cryptoassets*

Given the increasing involvement of financial institutions in DeFi (discussed in 4.1), it is essential to assess the Basel standards on cryptoassets and their role in mitigating emerging systemic risks. To address the prudential risks posed by cryptoassets, the Basel Committee on Banking Supervision (BCBS) implemented its final framework on the treatment of cryptoasset exposures on 1 January 2025.<sup>71</sup> Incorporated into the Basel Framework (Chapter SCO60), these standards represent the first globally coordinated effort to regulate bank exposure to digital assets. Crucially, the scope and design of the Basel framework suggest that it is concerned with regulating banks' exposures to cryptoassets, rather than the cryptoasset and DeFi ecosystem itself. This distinction

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<sup>68</sup> Ayten Kahya, Bhaskar Krishnamachari & Seokgu Yun, *Stablecoins: Reducing the Volatility of Cryptocurrencies* in Duc Tran, My Thai and Bhaskar Krishnamachari (eds), *Handbook on Blockchain* 446 (Springer International Publishing 2022).

<sup>69</sup> Alyze Sam, Koosha Azim & Adam Alonzi, *Stablecoin Economy: Ultimate Guide to Secure Digital Finance* 70 (Koosha Azim, 2020).

<sup>70</sup> European Central Bank, *supra* n. 48.

<sup>71</sup> Bank for International Settlements, *SCO60 - Cryptoasset Exposures* (2025) [https://www.bis.org/basel\\_framework/chapter/SCO/60.htm?inforce=20250101&published=20221216&tldate=20250907](https://www.bis.org/basel_framework/chapter/SCO/60.htm?inforce=20250101&published=20221216&tldate=20250907).

demonstrates how DeFi may operate outside the traditional financial regulatory framework despite performing functionally similar activities. The framework introduces a two-group classification, distinguishing between Group 1 cryptoassets, including tokenised traditional assets and stablecoins that meet strict regulatory conditions, and Group 2 cryptoassets, which comprise unbacked, volatile assets such as Bitcoin. Group 2 assets are subject to a 1250% risk weight, effectively requiring banks to fully capitalise these exposures.<sup>72</sup> This conservative capital treatment is designed to contain the risks of volatility, market contagion, and liquidity stress.

While these standards represent an important step in aligning capital requirements with the unique risk profiles of cryptoassets, they remain limited in scope and effectiveness, particularly in addressing the financial stability risks posed by decentralised finance (DeFi) and stablecoins. A main inefficiency lies in the narrow institutional focus of the framework. The Basel standards are designed for the prudential regulation of banking institutions. However, much of the systemic activity in the crypto ecosystem occurs outside the regulated banking sector.<sup>73</sup> Key actors, such as crypto exchanges, stablecoin issuers, custodians, hedge funds, and DeFi protocols, operate as non-bank financial institutions and are not subject to Basel's capital adequacy or liquidity standards. This creates a considerable regulatory gap. These non-bank entities perform critical financial functions, including lending, trading, and asset custody. Nonetheless, they do so without the oversight or resilience mechanisms that the Basel regime imposes on banks. As a result, the framework falls short of adequately containing systemic risks arising from indirect exposures and interdependencies between banks and the broader crypto ecosystem.

It is also important to note that the Basel Committee explicitly excludes stablecoins issued on permissionless blockchains from receiving more favourable capital treatment under Group 1 classification. The Committee claims that permissionless networks give rise to "unique risks" that cannot be adequately mitigated.<sup>74</sup> While this restriction reflects a strong prudential rationale, it also raises practical concerns. Given that most leading stablecoins, such as USDT, USDC, and

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<sup>72</sup> Ibid.

<sup>73</sup> Bank of England, *Reflections on DeFi, digital currencies and regulation* (2022) <https://www.bankofengland.co.uk/speech/2022/november/jon-cunliffe-keynote-speech-and-panel-at-warwick-conference-on-defi-digital-currencies>.

<sup>74</sup> Basel Committee on Banking Supervision, *Prudential Treatment of Cryptoasset Exposures* (2022) <https://www.bis.org/bcbs/publ/d545.pdf>.

DAI, operate on permissionless chains like Ethereum, the result is a de facto exclusion of nearly all stablecoins from the most favourable capital treatment. This may limit banks' ability to engage with a core pillar of DeFi infrastructure, even where they may seek to do so under robust internal risk frameworks.

Further, by imposing strict capital requirements and rigid classification thresholds, the Basel standards may unintentionally constrain the ability of banks to meet growing customer demand for digital asset services. This could accelerate disintermediation, as customers turn to less-regulated non-bank platforms for exposure to cryptoassets and stablecoins.<sup>75</sup> While the standards may succeed in restricting direct bank risk, they may not protect the financial system from systemic vulnerabilities if innovation continues to thrive outside the prudential perimeter. Despite their technical sophistication, the Basel standards fail to account for the structural interdependencies between banks and non-bank crypto actors, such as custody, settlement, and fund exposures. These indirect channels of contagion could transmit shocks from DeFi or stablecoin markets into the regulated financial system, particularly under conditions of market stress.

While the Basel cryptoasset framework constitutes a cautious and necessary step toward managing financial risk, it remains insufficient in its current form to address the full spectrum of threats to financial stability. Its narrow institutional focus, restrictive stance on permissionless blockchains, and exclusion of non-bank systemic actors significantly restrain its effectiveness as a comprehensive safeguard.

#### **4. DeFi Vulnerabilities**

This section analyses the key vulnerabilities inherent in DeFi and the channels through which these vulnerabilities may pose risks to financial stability. It emphasises how interconnectedness within DeFi, and between DeFi and traditional financial institutions, may amplify systemic risk. It also considers specific risk categories, including leverage and liquidity risks, as well as technological

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<sup>75</sup> The International Capital Market Association, *Comments in Response to the Second Consultation on the Prudential Treatment of Cryptoasset Exposures* (2022) <https://www.icmagroup.org/assets/Joint-TA-response-to-BCBS-2nd-consultation-crypto-assets-30092022.pdf>.

and operational risks, providing a structured framework for understanding the vulnerabilities that characterise the DeFi ecosystem.

#### *4.1 Structural Interconnectedness and Systemic Fragilities in DeFi*

Although still relatively small, DeFi continues to evolve rapidly in scale and scope. As a result, it is becoming more interconnected with the traditional financial system and has the potential to create new channels of systemic vulnerability.<sup>76</sup> One key lesson from the past is that even seemingly minor areas of distress can escalate into full-blown financial crises. The 2008 GFC provides a clear example of how seemingly minor areas of financial distress can trigger widespread economic turmoil. Despite its relatively small size, the subprime mortgage market became the core of the crisis. The problem stemmed from the securitisation of subprime loans into complex financial products like mortgage-backed securities (MBS) and collateralised debt obligations (CDOs).<sup>77</sup> Widely held by many financial institutions, these products created complex interdependencies. Rising defaults on subprime mortgages caused their value to collapse, triggering a contagion that destabilised the global financial system.

The lessons from the subprime crisis demonstrate how targeted disruptions in specific financial sectors can transform into systemic risks, a concern that becomes even more critical when examining DeFi's potential to amplify traditional financial vulnerabilities. Though not yet systemic in its current form, DeFi exhibits features, such as complexity, opacity, and leverage, that, under stress, could generate cascading effects akin to those seen in past financial crises. This article argues that while DeFi inherits some of the vulnerabilities of traditional finance, its specific features could amplify them. Although the processes DeFi uses to provide services are often innovative, the core functions it performs are not substantially different from those of traditional finance.<sup>78</sup> In attempting to replicate certain aspects of the traditional financial system, DeFi not only inherits many of the system's well-established vulnerabilities but may also amplify them. These vulnerabilities include liquidity and maturity mismatches, operational fragilities, leverage,

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<sup>76</sup> OECD, *Why Decentralised Finance (DeFi) Matters and the Policy Implications* (2022) [https://www.oecd-ilibrary.org/finance-and-investment/why-decentralised-finance-defi-matters-and-the-policy-implications\\_109084ae-en](https://www.oecd-ilibrary.org/finance-and-investment/why-decentralised-finance-defi-matters-and-the-policy-implications_109084ae-en).

<sup>77</sup> Arestis & Karakitsos, *supra* n. 8.

<sup>78</sup> Kaushal Shah et al, *A systematic Review of Decentralized Finance Protocols* 4 IJIN 171, 175 (2023).

and interconnectedness.<sup>79</sup> However, DeFi's unique characteristics can cause these vulnerabilities to manifest differently than they do in traditional finance, potentially leading to new risks and unforeseen consequences. This raises significant questions about DeFi's unique features and their potential to amplify traditional financial vulnerabilities. This research identifies several distinctive features of DeFi that shape its risks and vulnerabilities. First, there is a higher level of interconnectedness within the DeFi ecosystem, where different platforms and protocols are closely connected, increasing the potential for contagion when one part of the system faces distress.<sup>80</sup> Second, the lack of clear regulatory oversight can encourage excessive risk-taking, as participants may exploit regulatory gaps or engage in risky behaviour without proper safeguards.<sup>81</sup> Third, DeFi relies heavily on automated processes, such as smart contracts, which, while efficient, lack flexibility and may trigger large-scale liquidations or market disruptions if not appropriately designed.<sup>82</sup> Lastly, DeFi lacks traditional buffers like banks or access to central bank facilities.<sup>83</sup> This means that there are fewer mechanisms to absorb shocks or provide liquidity during market distress.

Further, the degree to which these highlighted vulnerabilities may pose a threat to financial stability is largely determined by the level of interconnectedness and the transmission channels linking DeFi, traditional financial systems, and the broader real economy. This interconnectedness means that shocks in DeFi, such as a significant protocol failure or liquidity crisis, could impact DeFi participants and spread to traditional markets and the real economy, amplifying the overall risk to financial stability.<sup>84</sup> This raises another significant question about the extent of interconnectedness between DeFi and TradFi. This paper distinguishes between two types of interconnectedness that could pose a risk to financial stability: interconnectedness within DeFi and interconnectedness between DeFi and TradFi.

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<sup>79</sup> Tim Weingärtner et al, *Deciphering DeFi: A Comprehensive Analysis and Visualization of Risks in Decentralized Finance* 16 JRFM 1, 11 (2023).

<sup>80</sup> Andry Alamsyah, Gede Natha Wijaya Kusuma & Dian Puteri Ramadhani, *A Review on Decentralized Finance Ecosystems* 16 Future Internet 76, 80 (2024).

<sup>81</sup> Ferreira, supra n. 6.

<sup>82</sup> Alamsyah, Kusuma & Ramadhani, supra n. 76.

<sup>83</sup> Jeungbo Shim, *Bank Capital Buffer and Portfolio Risk: The Influence of Business Cycle and Revenue Diversification* 37 J. Bank. Finance 761, 765 (2013).

<sup>84</sup> Aquilina, Frost & Schrimpf, supra n. 6.

Due to the complex web of dependencies between various platforms and protocols, the interconnectedness within the DeFi ecosystem could introduce structural fragilities with the potential to undermine financial stability. From an innovation perspective, while this feature enables the smooth development of new and cutting-edge financial products, it also introduces certain risks. Many DeFi protocols rely heavily on shared liquidity pools, collateral mechanisms, and automated smart contracts.<sup>85</sup> This implies that a disruption in one platform could rapidly propagate across the entire DeFi ecosystem. For instance, if a major lending protocol experiences a failure, whether due to a smart contract exploit or a market crash, it could trigger mass liquidations on other platforms that rely on the same assets or liquidity sources.<sup>86</sup> Such mass liquidations can drain liquidity from the broader DeFi ecosystem, amplifying price volatility and leading to a liquidity crisis. This interconnection amplifies the systemic risk within DeFi, where a single point of failure can quickly spread across various platforms, potentially destabilising the entire network.

Further, the growing interconnectedness between DeFi and TradFi is being accelerated by two key factors: the rising interest of institutional investors in DeFi and the heavy reliance on stablecoins within DeFi protocols. This deepening linkage may amplify financial system vulnerabilities, raising concerns about contagion risks and broader financial stability.<sup>87</sup> As noted above, stablecoins, often used as collateral or as a bridge between these two systems, play a critical role in this integration. Since more stablecoins serve as the foundation for DeFi transactions, the adoption of DeFi is likely to increase, bringing traditional financial players closer to the DeFi ecosystem. However, this development also represents one of the most significant vulnerabilities in DeFi. Any instability or failure related to stablecoins, whether due to depegging or liquidity issues, could serve as a direct transmission channel for financial shocks.<sup>88</sup> This could potentially impact the DeFi market and the TradFi system. Therefore, the increased use of stablecoins facilitates growth and may amplify systemic risk across both financial systems.

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<sup>85</sup> Schär, *supra* n. 6.

<sup>86</sup> European Central Bank, *supra* n 14.

<sup>87</sup> OECD, *supra* n. 72.

<sup>88</sup> Kun Duan & Andrew Urquhart, *The Instability of Stablecoins* 52 *Finance Res. Lett.* 1, 4 (2023).

Concerning the increasing interest of institutional investors in DeFi, although there is limited quantitative data on the precise level of institutional investor participation in DeFi, qualitative evidence from surveys indicates a rising interest and increasing investment in the system. Institutional transactions, defined as those exceeding USD 1 million, reached their highest levels in May and June 2021, making up 80-90% of all DeFi transactions during that period.<sup>89</sup> Large institutional transactions over USD 10 million comprised more than 60% of DeFi activity in the second quarter of 2021.<sup>90</sup> A geographical analysis of these institutional investors revealed that nations with historically significant institutional and professional financial markets are leading the charge in DeFi activity.<sup>91</sup> This trend is attributable to different drivers, including the prolonged search for yield in low-interest environments, the speculative appeal of high returns, and the perception of digital assets as a potential hedge against inflation.<sup>92</sup>

A 2021 Fidelity Digital Assets survey involving 1,100 institutional respondents found that 52% held digital assets in some form, with nearly 80% believing that digital assets, including cryptocurrencies, belong in an investment portfolio.<sup>93</sup> Notably, 70% of institutions reported plans to increase their allocation within the next year, and 81% within two to five years. Net inflows into crypto-specific investment funds reached USD 2.5 billion in just the first week of October 2021.<sup>94</sup> These figures are mirrored by a 2021 Intertrust survey, which revealed that hedge funds expect to allocate an average of 7.2% of their portfolios to crypto-assets over the next five years, a projection that could translate into approximately USD 312 billion in holdings across the hedge fund sector alone.<sup>95</sup> This trend is particularly pronounced among crypto-native funds, venture capital firms, and hedge funds, which are generally less constrained by conventional asset class restrictions and exhibit higher risk tolerance.

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<sup>89</sup> Chainalysis, *supra* n. 9.

<sup>90</sup> *Ibid.*

<sup>91</sup> *Ibid.*

<sup>92</sup> Organisation for Economic Co-operation and Development, *Institutionalisation of crypto-assets and DeFi-TradFi interconnectedness* (2022) [https://www.oecd.org/en/publications/institutionalisation-of-crypto-assets-and-defi-tradfi-interconnectedness\\_5d9dddbe-en.html](https://www.oecd.org/en/publications/institutionalisation-of-crypto-assets-and-defi-tradfi-interconnectedness_5d9dddbe-en.html).

<sup>93</sup> Fidelity Digital Assets, 2021 Institutional Investor Digital Assets Study (2021) <https://www.fidelitydigitalassets.com/research-and-insights/2021-institutional-investor-digital-assets-study>.

<sup>94</sup> *Ibid.*

<sup>95</sup> Financial Times, *Hedge funds expect to hold 7% of assets in crypto within five years* (2021) <https://www.ft.com/content/4f8044bf-8f0f-46b4-9fb7-6d0eba723017>.

As the most important intermediaries of TradFi, banks also face direct and indirect exposure to DeFi through multiple channels, creating potential vulnerabilities in the broader financial system. One of the main channels is lending to DeFi counterparts, which may include direct loans to entities involved in DeFi, such as (DApps) or crypto-asset platforms.<sup>96</sup> Banks could also have exposure to DeFi by extending loans to individuals, corporations, or other financial institutions, such as hedge funds, that invest in or participate in DeFi activities.<sup>97</sup> These loans increase the banks' indirect involvement in the DeFi ecosystem, creating a potential channel for financial risk to cross from DeFi into the traditional banking sector. Another significant channel through which banks may engage with DeFi is facilitating activities within the DeFi ecosystem. Banks could take on a more active and direct role by serving as issuers of tokenized assets or acting as validators within blockchain networks.<sup>98</sup> They may also offer wallet services, act as custodians for stablecoin reserves, or provide depository services to crypto-asset participants engaged in DeFi activities.<sup>99</sup>

To further illustrate the potential risks of institutional involvement in DeFi, it is important to consider how these connections highlight the increasing convergence of TradFi and DeFi. The collapse of Silicon Valley Bank (SVB) and other traditional financial institutions demonstrates the deep interconnectedness between TradFi and DeFi, challenging the perception that decentralised finance operates independently of traditional markets.<sup>100</sup> Although SVB was mainly a conventional bank, its failure sent shockwaves throughout the broader financial landscape, including the DeFi ecosystem. SVB's role as a banking partner to numerous tech startups and cryptocurrency companies highlighted how deeply the traditional banking sector is integrated with the operations of DeFi platforms. A crucial aspect of this interconnectedness was SVB's involvement with USDC, one of the most widely used stablecoins in DeFi.<sup>101</sup> With a significant portion of USDC's reserves

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<sup>96</sup> For example, Coindesk, *Siam Commercial Bank Is Chasing DeFi Yield Through Compound* (2022) <https://www.coindesk.com/business/2022/05/27/siam-commercial-bank-is-chasing-defi-yield-through-compound/>.

<sup>97</sup> Ibid.

<sup>98</sup> For example, Coindesk, *JPMorgan Wants to Bring Trillions of Dollars of Tokenized Assets to DeFi* (2022) <https://www.coindesk.com/business/2022/06/11/jpmorgan-wants-to-bring-trillions-of-dollars-of-tokenized-assets-to-defi/>.

<sup>99</sup> Basel Committee on Banking Supervision, *Designing a Prudential Treatment for Crypto-Assets* (2019) <https://www.bis.org/bcbs/publ/d490.htm>.

<sup>100</sup> Blockchain Governance Initiative Network, *Potential Points of Failure for Stablecoins: Did the Silicon Valley Bank collapse lead to DeFi instability?* (2023) [https://bgin-global.org/documents/20230724\\_PoF\\_of\\_Stablecoins.pdf](https://bgin-global.org/documents/20230724_PoF_of_Stablecoins.pdf).

<sup>101</sup> Luca Galati and Francesco Capalbo, *Silicon Valley Bank bankruptcy and Stablecoins stability* 91 IRFA 1, 4 (2024).

held at SVB, the bank's collapse led to a temporary depegging of USDC from the US dollar, causing widespread panic. This event triggered instability across DeFi platforms that rely on USDC for liquidity, collateral, and seamless trading. This shows the growing entanglement between DeFi and TradFi, illustrating how systemic risk may intensify as the operational boundaries between the two increasingly overlap, particularly when traditional banks begin to provide core infrastructure and services that are integral to DeFi's functioning.

After establishing the interconnectedness between DeFi and TradFi and the potential impact on financial stability, it is crucial to examine the risks associated with DeFi. It is important to emphasize that decentralisation in DeFi is a fundamental basis for analysing DeFi risks. DeFi presents several risks, including leverage and liquidity risks, and emerging risks stemming from its underlying technology, such as technological and operational risks. Arguably, the most concerning vulnerability in DeFi, which could threaten financial stability relates to liquidity mismatch and run risk associated with stablecoins (discussed in Section 5). While DeFi has shown resilience in certain stress scenarios, this section highlights how its technical and economic design can nonetheless amplify market vulnerabilities, particularly in the absence of prudential safeguards.

#### *4.2 Leverage and Liquidity Risks*

Leverage refers to the use of borrowed capital (debt) to increase the potential return on an investment.<sup>102</sup> Individuals or institutions take on debt or use derivatives to amplify their exposure to an asset, aiming to generate higher returns than would be possible with their own capital alone. Although leverage can enhance profits, it also increases risk: if the value of the investment moves against the leveraged position, losses can be amplified, potentially leading to financial instability.<sup>103</sup> DeFi is characterized by the extensive use of leverage, which can be sourced from lending and trading platforms. This high level of leverage may amplify market volatility and can contribute to procyclicality, increasing risks to financial stability.<sup>104</sup> DeFi allows for the rapid

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<sup>102</sup> Ross Cranston and others, *Principles of Banking Law* 38 (3rd edn, Oxford University Press, 2018).

<sup>103</sup> Matthias Haentjens & Pierre de Gioia Carabellese, *European Banking and Financial Law* 105 (Taylor & Francis, 2015).

<sup>104</sup> Bank for International Settlements, *DeFi Lending: Intermediation Without Information?* (2022) <https://www.bis.org/publ/bisbull57.pdf>.

accumulation of leverage through interconnected protocols. For instance, users can borrow funds from one DeFi platform and then use those borrowed assets as collateral on another, repeating this process multiple times.<sup>105</sup> With no formal limits on how often this can be done, very long chains of leverage can be created, often without visibility across platforms. Although protocols like Aave and MakerDAO enforce overcollateralization (e.g. 150% loan-to-value ratios), these mechanisms, as will be discussed later, do not eliminate risk. If the value of any underlying assets falls suddenly, these leveraged positions could unravel quickly because DeFi protocols typically enforce automatic liquidations when collateral falls below a certain threshold.<sup>106</sup> This automatic process could trigger a cascading effect across multiple platforms.

Further, liquidity risk occurs when there is a potential inability to meet payment obligations as they become due or when meeting these obligations can only be achieved at significantly excessive costs.<sup>107</sup> When liquidity fails for a borrower or trader, their position is forcibly liquidated, and the available assets are distributed to creditors or owners. A lack of liquidity can also amplify market inefficiencies, leading to exaggerated price fluctuations caused by trades.<sup>108</sup> In DeFi, liquidation processes operate differently compared to TradFi, where a centralised counterparty, such as a bank or a clearing house, typically manages and executes the process. Liquidity mismatches in DeFi occur when protocols depend on liquidity providers who lock up their assets using smart contracts to earn returns.<sup>109</sup> These locked assets supply funds for decentralised applications and are made available for users to borrow or trade. However, if liquidity providers suddenly decide to withdraw their assets, it can create liquidity shortages, potentially destabilising or even causing the collapse of the DeFi project in question.<sup>110</sup>

Leverage and liquidity risks in DeFi not only pose financial and operational challenges but also raise significant legal concerns that directly impact financial stability. The lack of formal regulation

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<sup>105</sup> Bank for International Settlements, *DeFi leverage* (2024) <https://www.bis.org/publ/work1171.htm>.

<sup>106</sup> Maria Demertzis Catarina Martins, *Decentralised Finance: Good Technology, Bad Finance* (2023) Bruegel Policy Brief <https://www.bruegel.org/policy-brief/decentralised-finance-good-technology-bad-finance>.

<sup>107</sup> Basel Committee on Banking Supervision, *Principles for Sound Liquidity Risk Management and Supervision* (2008) <https://www.bis.org/publ/bcbs144.pdf>.

<sup>108</sup> George Walker, *Liquidity Risk Management—Policy Conflict and Correction* 4 Cap. Mark. Law J. 451, 456 (2009).

<sup>109</sup> The Financial Stability Board, *supra* n. 36.

<sup>110</sup> Bekemeier, *supra* n. 7.

and oversight within DeFi platforms means that the legal responsibilities of participants, such as borrowers, lenders, and liquidity providers, are often unclear, complicating the resolution of disputes and the enforcement of contracts. This legal uncertainty, coupled with the absence of centralised authorities to manage leverage and liquidity, can amplify systemic risks. In cases of financial instability or market collapse, the lack of clear legal frameworks could hinder the ability to address these risks effectively, amplifying vulnerabilities across markets and potentially destabilising the broader financial system.

#### *4.3 Technological and Operational Risks*

Technology-driven and operational risks stem from the challenges and vulnerabilities associated with the daily operations and processes of DeFi platforms and protocols or from the underlying technology they rely on. These risks do not typically trigger systemic crises on their own, but they can act as amplifiers during periods of market stress. However, they can lead to operational disruptions, interfere with normal activities, and result in financial losses.<sup>111</sup> For instance, DeFi protocols rely heavily on the blockchain infrastructure. DApps also face technical constraints inherent to their respective blockchains. Any disruption to the blockchain, such as outages or network congestion can negatively impact the cost, functionality, and performance of the blockchain and the DeFi services built on it.<sup>112</sup> These disruptions can lead to forced liquidations and financial losses for DeFi users. Further, smart contracts carry several operational risks. DApps rely on various smart contracts that, once deployed, are often immutable and unstoppable. For a smart contract to function properly, it must be designed to account for numerous potential scenarios before deployment, which adds to its complexity.<sup>113</sup> This complexity increases the likelihood of coding errors and unpredictable behaviour. Smart contract code is widely reused, meaning that contracts that appear independent may share the same underlying technological vulnerabilities. The immutability nature of DeFi transactions suggests that if an error or fraudulent transaction occurs, it cannot be undone, and the original state before the mistake cannot be restored.<sup>114</sup> Theoretically, correcting such an issue would require the agreement of the affected parties and the

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<sup>111</sup> European Securities and Markets Authority, *Decentralised Finance in the EU: Developments and Risks* (2023) <https://www.esma.europa.eu/document/trv-article-decentralised-finance-eu-developments-and-risks>.

<sup>112</sup> Turillazzi et al, supra n. 16.

<sup>113</sup> Eurofi, supra n. 2.

<sup>114</sup> Syren Johnstone, *Rethinking the Regulation of Cryptoassets: Cryptographic Consensus Technology and the New Prospect* 141 (Edward Elgar Publishing Limited, Cheltenham 2021).

consensus of blockchain validators, making the process difficult.<sup>115</sup> If a significant error or exploit happens within a widely used DeFi platform, it could trigger cascading effects, causing market disruptions, forced liquidations, or losses that could impact both DeFi and TradFi systems, given their increasing interconnectedness. It is worth mentioning that in the DeFi ecosystem, oracles are essential components as they connect decentralised platforms with real-world data. These external data sources operate off-chain, making them vulnerable to manipulation and errors, such as price manipulation through security breaches.<sup>116</sup> This could trigger mass liquidations or contract failures across multiple platforms and result in sudden market disruptions, reducing trust in the DeFi system. This stresses the need for reliable and secure oracles with strong protective measures. Ensuring that the data provided by oracles is authentic and free from tampering by malicious actors is critical for maintaining the integrity and stability of the DeFi ecosystem.<sup>117</sup>

The technological and operational vulnerabilities of DeFi highlight critical weaknesses in its ecosystem and emphasise the pressing need to address the legal and regulatory challenges they present, particularly regarding financial stability. In TradFi, regulators establish legal frameworks to ensure that risks, such as system failures, or fraud, are properly mitigated to maintain stability. However, the decentralised nature of DeFi complicates the application of existing financial stability laws. Without central authorities to enforce legal accountability, the responsibility for addressing technological failures or malicious attacks falls to decentralised protocols, leaving a regulatory gap. This gap can undermine financial stability, as there is no clear recourse for affected parties in the event of significant disruptions.

## **5. Liquidity Mismatches and Run-Risk in Stablecoins**

Although stablecoins are a relatively recent development, the long history of bank runs and crises involving financial intermediaries has given rise to various theories explaining their underlying causes. The strategic run theory, pioneered by Diamond and Dybvig in 1983, provides a core framework for understanding bank runs and their underlying causes.<sup>118</sup> In their model, banks

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<sup>115</sup> Alshaleel, supra n. 25.

<sup>116</sup> Banco de Portugal, *Occasional paper on Decentralised Finance* (2024) <https://www.bportugal.pt/en/paper/occasional-paper-decentralised-finance>.

<sup>117</sup> Bank for International Settlements, *The Oracle Problem and The Future of DeFi* (2023) <https://www.bis.org/publ/bisbull76.pdf>.

<sup>118</sup> Diamond & Dybvig, supra n. 11.

engage in maturity transformation by borrowing short-term deposits and lending them out long-term.<sup>119</sup> This structure makes banks inherently vulnerable to liquidity crises, where depositors, fearing that others will withdraw their funds, run to withdraw their deposits simultaneously. Banks, which do not have enough liquid assets to meet all withdrawal requests, are forced into insolvency. The fear of others withdrawing causes a chain reaction, resulting in a "strategic run".<sup>120</sup> Regarding stablecoins, a strategic run may happen when stablecoin holders believe it is beneficial to redeem their coins before others do.

Another prominent theory of runs suggests that panic can occur when a market event prompts highly cautious investors to recognize that assets they once considered safe may carry some risk of loss.<sup>121</sup> This shift in perception leads investors to treat those with even slight risks more cautiously. This view is particularly relevant to stablecoins, which many users have viewed as money-like instruments and a secure store of value within the cryptocurrency ecosystem.

The theoretical insights into bank runs offer a critical foundation for understanding the vulnerabilities of stablecoins, particularly their susceptibility to liquidity and maturity transformation risks, which can exacerbate the potential for investor runs and systemic contagion. Generally, stablecoins are marketed as being stable and pegged to a specific reference asset. This gives users the perception that they can redeem them for the underlying asset anytime.<sup>122</sup> This view alone is sufficient to create liquidity and maturity transformation vulnerabilities, as the reserve assets backing the stablecoins may be illiquid or have longer maturity periods. Liquidity mismatches increase the possibility of investor runs, where a loss of confidence could trigger widespread withdrawals.<sup>123</sup> Such runs could contagiously spread, not only between different stablecoins but also to other financial institutions that could have similar risk profiles, potentially

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<sup>119</sup> Ibid.

<sup>120</sup> Ibid.

<sup>121</sup> For example, Nicola Gennaioli, Andrei Shleifer & Robert Vishny, Neglected Risks, Financial Innovation and Financial Fragility 104 *J. financ. econ.* 452,458 (2012).

<sup>122</sup> Gordon Y. Liao & John Caramichael, *Stablecoins: Growth Potential and Impact on Banking* (2022) International Finance Discussion Papers 1334. Washington: Board of Governors of the Federal Reserve System <https://www.federalreserve.gov/econres/ifdp/files/ifdp1334.pdf>.

<sup>123</sup> Franklin Allen & Douglas Gale, *Understanding Financial Crises* 76 (OUP, 2009).

creating systemic risk. The threat to the broader financial system could increase rapidly, particularly in the absence of adequate prudential regulations and safeguards to contain the risks.

It is significant to highlight that the run-risk associated with stablecoins closely mirrors that of traditional financial institutions, particularly money market funds, where investors expect to redeem their shares at face value. Therefore, to fully grasp the run-risk in stablecoins and its potential impact on financial stability, it is essential to consider the run-risk observed in money market funds.

### *5.1 Money Market Funds: Breaking The Buck and The Phenomenon of Runs*

Money market funds (MMFs) are a type of mutual fund that invests in short-term debt instruments.<sup>124</sup> They function as collective investment vehicles that raise capital by issuing shares or units to the public. These funds are open-ended: they commit to buy back their shares or units on any regular business day.<sup>125</sup> As a result, money market funds provide financing to financial institutions, corporations, and governments. Typically, they invest in instruments such as asset-backed commercial paper, certificates of deposit, repurchase agreements, commercial paper, short-term bonds from private issuers, shares of other money market funds, and government securities.<sup>126</sup> The nature and purpose of MMFs distinguish them from other financial services or market participants, such as mutual funds and banks. Unlike mutual funds, where the net asset value (NAV) can change daily, MMFs aim to maintain a stable NAV, usually \$1.00 per share in the US and €1 in the EU. In contrast, the NAV of mutual funds fluctuates based on the changing value of the assets within the fund's portfolio.<sup>127</sup>

MMFs' ability to maintain a stable share price is widely regarded as a major factor behind their popularity. Many investors perceive money market funds as similar to bank deposits, as they offer comparable features such as preserving the principal's value and providing quick access to

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<sup>124</sup> Jonathan Lim, *Untangling the Money Market Fund Problem: A Public-Private Liquidity Fund Proposal* 19 *Stan.J.L.Bus.Fin* 63-80 (2013).

<sup>125</sup> Nicholas Broke, *Money Market Funds and Systemic Risk: A Critique of the SEC's 2014 Reforms* 14 *GJLPP* 289, 295 (2016).

<sup>126</sup> Jeff Madura, *Financial Markets and Institutions* 627 (11<sup>th</sup> edn, Cengage Learning 2014).

<sup>127</sup> Alshaleel *supra* n. 57, 10.

liquidity.<sup>128</sup> This perception has made them an attractive investment option for those seeking stability and easy withdrawal options.

MMFs were at the heart of the global financial crisis of 2008, exposing their vulnerability to systemic risk and susceptibility to investor runs. While they did not cause the crisis, their behaviour during that period revealed their potential to expand or spread financial turmoil.<sup>129</sup> A money market fund "breaks the buck" when the value of its shares drops below the typical \$1.00 or €1.00 mark, often due to a large volume of redemptions that the fund's liquidity cannot sustain.<sup>130</sup> In this case, investors cannot redeem their shares at the expected value, prompting a rush to withdraw funds, triggering a run. This can lead to widespread panic across the MMF industry, with redemptions spreading from one fund to another. In U.S. history, only two money market funds have broken the buck, most notably in 2008 when the Reserve Primary Fund lowered its NAV to \$0.97.<sup>131</sup> The shareholders requested redemptions of approximately \$40 billion in just two days, triggering a rapid run. This contagion swiftly spread to other prime money market funds, leading to investors withdrawing approximately \$310 billion from these funds within a week.<sup>132</sup> MMFs were forced to sell off their portfolio securities to accommodate these large redemption requests. Simultaneous forced sales of MMF assets can result in price drops across the market or within a particular sector. This, in turn, is likely to impact other institutions holding similar assets, potentially jeopardising the overall stability of the financial system.

In response, on July 23, 2014, the U.S. Securities and Exchange Commission (SEC) implemented significant reforms to the regulatory framework governing money market funds, which came into force in October 2016. The key elements of the reform included the introduction of a floating NAV, and the liquidity fees and redemption gates.<sup>133</sup> Similarly, in the European Union, a new regulation on MMFs was published in the EU Official Journal on June 30, 2017, and became effective on

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<sup>128</sup> Frank Fabozzi, *Capital Markets: Institutions, Instruments, and Risk Management* 648 (5th edn, MIT Press, 2015).

<sup>129</sup> Viral V Acharya and others, *Regulating Wall Street: The Dodd-Frank Act and the New Architecture of Global Finance* 308 (John Wiley & Sons, 2010).

<sup>130</sup> Gary Gorton, *Misunderstanding Financial Crises: Why We Don't See Them Coming* 49 (OUP USA, 2012).

<sup>131</sup> Carlton Price, *What Money Market Mutual Fund Reform Means for Banks and Money Market Deposit Accounts* 19 N.C. Bank. Inst. 243,250(2015).

<sup>132</sup> Evanoff Douglas & Moeller William, *Dodd-Frank Wall Street Reform and Consumer Protection Act: Purpose, Critique, Implementation Status and Policy Issues* 128 (World Scientific, 2014).

<sup>133</sup> Alshaleel, supra n. 12.

July 21, 2017.<sup>134</sup> While the EU reform mirrored the U.S. changes with the adoption of liquidity fees and redemption gates, it also introduced Low Volatility NAV money market funds.<sup>135</sup>

It is worth noting that money market funds faced significant runs during the COVID-19 pandemic in 2020. As markets experienced extreme volatility and uncertainty, investors rushed to redeem their shares from MMFs, particularly from prime funds.<sup>136</sup> The crisis highlighted the ongoing vulnerability of MMFs to liquidity pressures and their potential to amplify broader financial system risks during periods of economic stress.

The forgoing discussions raise important questions about the parallels between MMFs and stablecoins, particularly whether a stablecoin run shares similar characteristics with a run on money market funds. Exploring these similarities could shed light on the potential risks stablecoins pose to financial stability. MMFs and stablecoins share several similarities, particularly in their operations and the risks they pose to financial stability. A key similarity between stablecoins and MMFs is that both are viewed as low-risk, liquid investments, giving users the perception that they can redeem their holdings at or near face value on demand.<sup>137</sup> This characteristic makes them attractive to investors seeking stable value and easy access to liquidity. Further, since MMFs and stablecoins engage in liquidity and maturity transformation, they are vulnerable to runs. Another similarity between MMFs and stablecoins is the variation in risk levels they assume: certain stablecoins carry more risk than others.<sup>138</sup> In fact, stablecoins demonstrate an even broader range of risk profiles compared to money market funds.

While MMFs and stablecoins share some similarities, they differ in several key aspects. First, MMFs are subject to extensive regulations that govern their operations and risk management, while stablecoins operate in a much less regulated environment.<sup>139</sup> Secondly, MMFs are typically

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<sup>134</sup> Parliament and Council Directive on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS) [2009] oJ23/203L.

<sup>135</sup> Alshaleel, *supra* n. 12.

<sup>136</sup> Nicholas Apergis, Money Market Funds (MMFs) and the Covid-19 pandemic: Has the MMLF benefited money markets? 46 *Fin. Res. Lett.* 1, 3 (2022).

<sup>137</sup> Sang Rae Kim, How the Cryptocurrency Market is Connected to the Financial Market (2022) SSRN [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4106815](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4106815).

<sup>138</sup> Arner, Auer & Frost, *supra* n. 10.

<sup>139</sup> Alshaleel, *supra* n. 12.

backed by large financial institutions such as banks, whereas stablecoins are issued by digital asset companies such as startups or tech-driven firms. Thirdly, the investor base for MMFs consists largely of institutional investors, while stablecoins primarily attract retail investors and entities involved in the cryptocurrency space.<sup>140</sup> Fourthly, MMFs do not trade on secondary markets and are redeemed directly at par value with the fund, whereas stablecoins are traded on cryptocurrency exchanges (such as Coinbase), with redemption rights and mechanisms varying significantly across different stablecoins. Finally, money market funds are backed solely by traditional financial instruments, such as short-term debt securities, while stablecoins may be backed by a combination of digital assets, traditional assets, or even algorithms designed to maintain their peg.<sup>141</sup>

The comparison between MMFs and stablecoins demonstrates their shared potential to amplify financial instability through runs. As shown during the global financial crisis of 2008, MMF runs not only destabilized the funds themselves but also had far-reaching effects on the broader financial system. Similarly, stablecoins, with their perceived stability and widespread use in DeFi, could become a comparable source of systemic risk. Their vulnerabilities, particularly in the absence of robust regulatory oversight, make them susceptible to sudden runs that could ripple across financial markets, highlighting the urgent need for robust monitoring systems to detect and mitigate these emerging risks effectively.

### *5.2 Triggers of Stablecoins Runs*

While some scholars discuss stablecoin runs without distinguishing between the different types of stablecoins, this article adopts a distinctive approach.<sup>142</sup> It argues that the triggers for stablecoin runs are not the same but rather depend on the specific type of stablecoin. The reserve assets, collateral mechanisms, and operational structures vary across various categories of stablecoins, influencing how and when these runs are likely to occur. Stablecoins are generally minted in exchange for fiat currency that an issuer gets from a user or third party. To maintain their value

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<sup>140</sup> Arner, Auer & Frost, *supra* n. 10.

<sup>141</sup> Duan & Urquhart, *supra* n. 84.

<sup>142</sup> For example, Hilary J. Allen, *DeFi: Shadow Banking 2.0?* 64 *Wm. & Mary Env'tl. L.* 919, 930 (2023); Kenechukwu Anadu et al, *Runs and Flights to Safety: Are Stablecoins the New Money Market Funds?* (2023) FRB of New York Staff Report No. SSRN [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4580392](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4580392); Nico Oefele, Dirk G. Baur & Lee A. Smales, *Flight-to-Quality—Money Market Mutual Funds And Stablecoins During The March 2023 Banking Crisis* 234 *Econ. Lett.* 1, 4 (2024).

relative to fiat currency, many stablecoins create the expectation that they can be redeemed at a 1:1 ratio upon request.<sup>143</sup> These stablecoins are often promoted as being backed by various reserve assets. However, there is no uniform standard governing the composition of these reserve assets. The risk profiles of stablecoins differ significantly based on their reserve holdings. While some are backed by safer assets like bank deposits or Treasury bills, others hold riskier instruments such as commercial paper, corporate bonds, or even other digital assets.<sup>144</sup> It is important to note that stablecoin redemption rights can vary significantly concerning who is eligible to present a stablecoin for redemption and the limitations on the quantity that may be redeemed. Some issuers may delay redemption payments for up to seven days, or in some cases, even suspend redemptions entirely, adding uncertainty around when redemptions will occur.<sup>145</sup> This variability creates substantial unpredictability regarding both access and timing of redemptions, which could lead to instability during times of high demand for liquidity.

For fiat-backed stablecoins, which are closely tied to the traditional financial system, the issuer's ability to maintain its redemption promise largely depends on the quality of the reserve assets.<sup>146</sup> While fiat-backed stablecoins share similarities with MMFs regarding their balance sheet structure, they may have more pronounced vulnerabilities. Since the value of the stablecoin is backed by fiat currency on a 1:1 basis, even a modest decrease in the value of the reserves can prevent the issuer from fulfilling all redemptions. As a result, adverse market conditions could lead to concerns that the reserve assets might lose value or become illiquid, prompting a strategic run.<sup>147</sup> In the absence of mechanisms (such as deposit insurance) to guarantee redemptions, it is critical that the reserve assets remain highly liquid and free from credit risk, ensuring the stablecoin's redemption mechanism can resist adverse market situations.

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<sup>143</sup> Arner, Auer & Frost, *supra* n. 10.

<sup>144</sup> European Central Bank, *supra* n. 48.

<sup>145</sup> Tether states on its website that "verified customers" are eligible to request redemptions. However, in the event of an emergency, these redemptions may be suspended. Additionally, Tether reserves the option to redeem "in-kind", meaning that redemptions could be fulfilled instead of cash using non-cash assets from its reserves.

<sup>146</sup> Philipp Sandner, Jonas Gross & Roman Avdeev, *Digital Euro: Issued by Commercial Banks, Digitally Transforming the Industry* in Filippo Zatti and Rosa Giovanna Barresi (eds), *Digital Assets and the Law: Fiat Money in the Era of Digital Currency* 29 (Taylor & Francis 2024).

<sup>147</sup> Keith Bear, *Money in the Metaverse* in Hung-Yi Chen, Pawee Jenweeranon and Nafis Alam (eds), *Global Perspectives in the Metaverse: Law, Economics, and Finance* 181 (Springer, 2024).

Fiat-backed stablecoins have generally adopted conservative approaches in terms of their reserve asset composition. For example, USD Coin (USDC) has consistently maintained reserves solely in cash, cash equivalents, and U.S. Treasury bills since its inception.<sup>148</sup> In contrast, Tether's reserve is more diversified but includes relatively riskier assets, such as corporate bonds, and even investments in crypto assets.<sup>149</sup> Despite USDC being regarded as one of the safest stablecoins due to its conservative reserve portfolio, its stability came into question in March 2023 following the collapse of SVB. This event led to concerns about USDC's ability to maintain its peg, resulting in a temporary depegging of the coin. Interestingly, since 2020, commercial banks have increasingly provided services to crypto-related clients, with stablecoins significantly growing their deposits in these banks.<sup>150</sup> If one of these banks faces financial difficulties, a stablecoin could lose access to its deposits and fail to meet its redemption obligations, triggering a potential run by investors. USDC encountered this issue when SVB experienced a bank run on March 9, 2023, leading to the Federal Deposit Insurance Corporation (FDIC) taking control of the bank the following day, March 10.<sup>151</sup>

Circle, the issuer of USDC, had a portion of its reserves held at Silicon Valley Bank (SVB). When the bank faced a run, concerns emerged about Circle's ability to maintain its 1:1 peg, where each USDC could be redeemed for one U.S. dollar. These concerns caused a loss of confidence, leading to the value of USDC dropping to \$0.87 on the secondary market.<sup>152</sup> It was reported that between March 10-15, around \$4.46 billion in USDC was redeemed.<sup>153</sup> The depegging destabilised the broader DeFi ecosystem, affecting other stablecoins like DAI, which is partly backed by USDC. The run had an impact on centralised exchanges and decentralised exchanges. Coinbase and Binance, for example, temporarily suspended USDC conversions due to the heavy outflows.<sup>154</sup>

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<sup>148</sup> Circle, How the USDC Reserve is Structured and Managed (2023) <https://www.circle.com/blog/how-the-usdc-reserve-is-structured-and-managed>.

<sup>149</sup> Tether, *Transparency* (2023) <https://tether.to/en/transparency/?tab=reports>.

<sup>150</sup> Kenechukwu Anadu et al, *Runs and Flights to Safety: Are Stablecoins the New Money Market Funds?* (2023) FRB of New York Staff Report No. SSRN [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4580392](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4580392).

<sup>151</sup> The Federal Deposit Insurance Corporation, FDIC Acts to Protect All Depositors of the former Silicon Valley Bank, Santa Clara, California (2023) <https://www.fdic.gov/news/press-releases/2023/pr23019.html>.

<sup>152</sup> S&P Global, Stablecoins: A Deep Dive into Valuation and Depegging (2023) <https://www.spglobal.com/en/research-insights/special-reports/stablecoins-a-deep-dive-into-valuation-and-depegging#:~:text=During%20the%20weekend%20of%20March,Bank%2C%20were%20no%20longer%20operating.>

<sup>153</sup> Nansen Research Portal, <https://research.nansen.ai/articles/usdc-de-peg-what-happened-on-chain>.

<sup>154</sup> S&P Global, supra n. 144.

The SVB–USDC incident demonstrates how DeFi-linked stablecoins are no longer isolated from traditional financial institutions. This event illustrates a bidirectional risk: distress in TradFi could destabilise DeFi through stablecoin channels, and vice versa.

Compared to fiat-backed stablecoins, crypto-backed stablecoins are inherently more fragile due to their reliance on unbacked crypto assets, which may have no intrinsic value and are highly susceptible to significant price volatility.<sup>155</sup> If the value of the collateral supporting a crypto-backed stablecoin drops sharply, users may lose confidence in the over-collateralisation and other protective buffers, fearing that they are insufficient, or may soon become insufficient, to maintain the stablecoin's value. This could easily trigger a strategic run, as users rush to redeem their holdings before the stablecoin's value collapses further.

Finally, algorithmic stablecoins are particularly prone to run risk due to their lack of full reserve backing.<sup>156</sup> These stablecoins, such as TerraUSD and Frax, attempt to maintain their peg through a system of convertibility with another unbacked crypto asset. Although this model might give the appearance of stability similar to crypto-backed stablecoins, the values of the two assets become interconnected. This creates a fragile structure similar to a pyramid scheme, requiring continuous inflows of capital to maintain equilibrium. When market conditions develop and inflows shift to outflows, the stabilisation mechanism fails, potentially triggering a collapse in the value of both the stablecoin and the supporting crypto asset.<sup>157</sup> This makes algorithmic stablecoins highly susceptible to speculative attacks or sudden market sentiment shifts. The 2022 run on TerraUSD highlighted the inherent vulnerabilities of algorithmic stablecoins and their potential to disrupt financial stability. Much like the runs on money market funds in 2008 and 2020, the TerraUSD collapse demonstrated how quickly market sentiment can shift, leading to destabilising cycles of panic and mass redemptions, exacerbating the fragility of these financial instruments. TerraUSD was an algorithmic stablecoin aimed at maintaining a 1:1 peg to the U.S. dollar without holding a reserve of assets for backing. By early May 2022, it had become the third-largest stablecoin with

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<sup>155</sup> Nuant, *What Are Crypto-Backed Stablecoins and How Do They Work?* (2024)

<https://www.nuant.com/blog/what-are-crypto-backed-stablecoins-and-how-do-they-work>.

<sup>156</sup> Sandner, Gross & Avdeev, *supra* n. 138, 29.

<sup>157</sup> Bains et al, *supra* n. 44, 22.

a market capitalisation of \$18 billion.<sup>158</sup> Although TerraUSD could be used across over 100 DeFi platforms on the Terra blockchain, the majority of its activity was concentrated on Anchor, a peer-to-peer lending platform that offered deposit yields close to 20%.<sup>159</sup> TerraUSD maintained its peg through an arbitrage mechanism involving Luna, Terra's native unbacked crypto asset, which had a fluctuating market value. LUNA functioned as a stabilising mechanism, acting as a reserve asset, designed to work in tandem with fluctuations in the value of TerraUSD.<sup>160</sup> Its supply would be adjusted dynamically to mitigate any volatility caused by changes in TerraUSD's price, aiming to keep the stablecoin's value steady. At its peak in April 2022, Luna traded for over \$116 and had a market capitalisation of roughly \$40 billion.<sup>161</sup>

In May 2022, the Terra ecosystem collapsed in under a week. On May 8 and 9, TerraUSD's liquidity sharply declined across various DeFi protocols and crypto exchanges, causing its price to drop below \$0.70.<sup>162</sup> This led to a massive wave of redemptions, as users exchanged TerraUSD for newly minted LUNA tokens, which resulted in the prices of both assets falling. The collapse wiped out approximately \$60 billion in market value within that week.<sup>163</sup>

The run on TerraUSD spread to other stablecoins. In the immediate aftermath, Tether, the largest stablecoin by market capitalisation, dropped to as low as \$0.94, resulting in redemptions totalling around \$10 billion.<sup>164</sup> Although TerraUSD was not directly connected to Tether, the contagion exemplifies a panic run driven by a loss of confidence. The collapse of the Terra/Luna ecosystem also affected other major players in the crypto industry. Crypto hedge fund Three Arrows Capital (3AC), which reportedly managed over \$18 billion at its peak, was heavily invested in Terra/Luna

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<sup>158</sup> Reserve Bank of Australia, *Stablecoins: Market Developments, Risks and Regulation* (2022) [https://www.rba.gov.au/publications/bulletin/2022/dec/stablecoins-market-developments-risks-and-regulation.html#:~:text=In%20early%20May%202022%2C%20the,of%20its%20stabilisation%20mechanism%20\(Graph\).](https://www.rba.gov.au/publications/bulletin/2022/dec/stablecoins-market-developments-risks-and-regulation.html#:~:text=In%20early%20May%202022%2C%20the,of%20its%20stabilisation%20mechanism%20(Graph).)

<sup>159</sup> Martins, *supra* n. 98.

<sup>160</sup> Aquilina, Frost & Schrimpf, *supra* n. 6.

<sup>161</sup> Federal Reserve Bank of New York, *The Financial Stability Implications of Digital Assets* (2022) [https://www.newyorkfed.org/research/staff\\_reports/sr1034](https://www.newyorkfed.org/research/staff_reports/sr1034).

<sup>162</sup> *Ibid.*

<sup>163</sup> *Ibid.*

<sup>164</sup> The Guardian, *Tether Pays Out \$10bn in Withdrawals Since Start of Crypto Crash* (2022) <https://www.theguardian.com/technology/2022/may/22/tether-pays-out-10bn-in-withdrawal-since-crypto-crash>.

and has since been ordered to liquidate its assets.<sup>165</sup> Furthermore, Terra's founder attempted to maintain TerraUSD's peg by selling off \$2.4 billion worth of Bitcoin before the collapse. These efforts, however, led to significant pressure on major crypto-assets.<sup>166</sup> As a result, prices of key assets like Bitcoin dropped by around 60% between April and June, triggering margin calls, mass selloffs, and forced liquidations across the market.<sup>167</sup>

The collapse of TerraUSD highlights the fragility of algorithmic stablecoins, especially during adverse market conditions. Its failure demonstrated how quickly such systems can break down, leading to contagion that spreads to other stablecoins and even the broader market. While TerraUSD was not systemically significant in the traditional financial system, its collapse triggered widespread contagion across decentralised markets, including the failure of major funds like Three Arrows Capital. While these losses were largely contained to the crypto sector, they revealed the growing exposure of institutional players to DeFi-based instruments. The collapse also illustrates the regulatory blind spots associated with algorithmic designs that lack enforceable obligations or reserve backing. Prudential frameworks like Basel's crypto exposure rules currently do not fully capture these risks, particularly when non-bank actors are involved.

### *5.3 Resilience in DeFi Protocols: A Cautious Appraisal*

It is often argued that DeFi shows inherent resilience through mechanisms such as overcollateralization and automated liquidation. These mechanisms are frequently cited as structural safeguards that allow DeFi protocols to absorb shocks without central intervention.<sup>168</sup> However, while these mechanisms may operate under normal market conditions, their robustness in periods of severe stress remains deeply uncertain.<sup>169</sup> Their operation lacks the legal

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<sup>165</sup> Coindesk, FSInsight Accuses Three Arrows Capital of Running a Madoff-Style Ponzi Scheme (2022) <https://www.coindesk.com/business/2022/06/28/research-firm-fsinsight-accuses-three-arrows-capital-of-running-a-madoff-style-ponzi-scheme/>.

<sup>166</sup> Christiaan Hetzner, *Luna Foundation Guard Has Now Dumped \$2.4 Billion From Its Bitcoin Reserves in Failed Attempt To Defend TerraUSD Peg* (2022) <https://www.yahoo.com/video/luna-foundation-guard-now-dumped-145139063.html?guccounter=1>.

<sup>167</sup> Ibid.

<sup>168</sup> Bank of Canada, *Liquidation Mechanisms and Price Impacts in DeFi* (2025) <https://www.bankofcanada.ca/wp-content/uploads/2025/03/swp2025-12.pdf>.

<sup>169</sup> Organisation for Economic Co-operation and Development, *DeFi liquidations: Volatility and liquidity* (2023) [https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/07/defi-liquidations\\_89cba79d/0524faaf-en.pdf](https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/07/defi-liquidations_89cba79d/0524faaf-en.pdf).

enforceability, regulatory oversight, and institutional protections that underpin similar processes in TradFi, raising concerns about their ability to mitigate systemic risk.

Collateral, when effectively seized and liquidated, has long served as a foundation of credit risk management. However, in the DeFi context, several design features can compromise the reliability of these mechanisms. Most smart contracts cannot autonomously liquidate collateral without external intervention.<sup>170</sup> Rather, protocols must rely on bots or incentivise third-party actors, known as liquidators, to initiate the process. This introduces conflicts: discounts must be offered to compensate liquidators for risk and execution costs, but in periods of volatility, gas fees (transaction fees) often spike and network congestion delays transactions.<sup>171</sup> As a result, price oracles may provide stale data, undermining the accuracy and fairness of liquidation events.

These weaknesses were clearly demonstrated during the “Black Thursday” market crash on 12 March 2020, when the price of Ether fell over 20% in a single day.<sup>172</sup> Liquidations overwhelmed protocols like MakerDAO, causing failures in auction mechanisms and allowing some positions to be liquidated for near-zero returns. More recently, a liquidation event involving Compound and Uniswap (DeFi protocols) demonstrated the systemic fragility of automated liquidations. In that case, a single liquidation transaction, where Ether was sold for USDC, resulted in a 7% price drop in the Ether/USDC pair, solely due to the liquidation activity.<sup>173</sup> This shows how concentrated sales can rapidly depress asset prices, triggering further rounds of liquidation.

Beyond operational issues, overcollateralization itself introduces structural inefficiencies and underlying risks. While high collateral ratios, typically exceeding 100%, reduce default probabilities, they also reduce capital efficiency and incentivise recursive borrowing, where users

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<sup>170</sup> Jonathan Chiu et al. *On the Fragility of DeFi Lending*, Bank of Canada (2025)  
[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4328481](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4328481).

<sup>171</sup> Ibid.

<sup>172</sup> CoinDesk, *Ether Suffers Record-Setting 33% Drop Amid Global Market Turmoil* (2020)  
<https://www.coindesk.com/markets/2020/03/12/ether-suffers-record-setting-33-drop-amid-global-market-turmoil>.

<sup>173</sup> Kaihua Qin et al. *Mitigating Decentralized Finance Liquidations with Reversible Call Options* (2023)  
<https://discovery.ucl.ac.uk/id/eprint/10182193/1/miqado.pdf>.

repeatedly repledge borrowed assets as collateral.<sup>174</sup> This practice concentrates leverage and could produce feedback loops that exacerbate price declines in volatile markets.<sup>175</sup> Further, recursive borrowing can amplify hidden correlations within the system, reducing the diversification benefits that DeFi protocols often claim.

Automated liquidation compounds these risks. Because liquidations are triggered mechanically based on preset thresholds, substantial asset price drops can prompt mass liquidations across protocols.<sup>176</sup> In illiquid markets, this selling pressure depresses collateral values further, triggering additional rounds of liquidation, a dynamic that closely mirrors the liquidity spirals observed during the 2008 financial crisis.<sup>177</sup> These liquidation spirals cause heavy losses for users, make it harder to trade by widening price gaps, and increase price swings across decentralised markets.

Notably, these mechanisms do not exist in isolation. Simultaneous liquidations across spot and derivatives markets,<sup>178</sup> especially on unregulated exchanges, could produce correlated sell-offs, exacerbating market stress. As institutional investors gain exposure to DeFi products, the potential for these dynamics to spill over into TradFi markets increases, blurring the boundary between DeFi and TradFi. While DeFi protocols have thus far survived several stress episodes, this endurance often comes at a cost to financial consumers, who may face significant capital losses and high transaction costs. These mechanisms have, to date, performed as crisis absorbers only under favourable conditions and low contagion risk. They should not be mistaken for structural resilience.

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<sup>174</sup> In DeFi, recursive borrowing describes a practice in which a user borrows an asset and promptly redeposits it into the same lending protocol. This cycle is repeated to amplify returns, particularly when platform incentives or reward tokens outweigh the costs of borrowing.

<sup>175</sup> Steven L. Schwarcz, *Secured Transactions and Financial Stability: Regulatory Challenges 1* Duke University School of Law 45, 48 (2018).

<sup>176</sup> Organisation for Economic Co-operation and Development, *DeFi liquidations: Volatility and liquidity* (2023) [https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/07/defi-liquidations\\_89cba79d/0524faaf-en.pdf](https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/07/defi-liquidations_89cba79d/0524faaf-en.pdf).

<sup>177</sup> Financial Stability Board, *Risk Management Lessons from the Global Banking Crisis of 2008* (2009) [https://www.fsb.org/uploads/r\\_0910a.pdf](https://www.fsb.org/uploads/r_0910a.pdf).

<sup>178</sup> Steven L. Schwarcz, *Secured Transactions and Financial Stability: Regulatory Challenges 1* Duke University School of Law 45, 48 (2018).

<sup>178</sup> Organisation for Economic Co-operation and Development, *DeFi liquidations: Volatility and liquidity* (2023) [https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/07/defi-liquidations\\_89cba79d/0524faaf-en.pdf](https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/07/defi-liquidations_89cba79d/0524faaf-en.pdf).

In the absence of regulatory oversight, legal accountability, or transparency requirements, the effectiveness of these mechanisms under stress remains uncertain, raising serious concerns about investor protection, market integrity, and systemic resilience. Without enforceable standards for orderly liquidation, risk disclosure, or redress mechanisms, these protocols rely fully on self-executing code and incentives. While innovative, these features remain untested under more extreme systemic events, and their limitations must be carefully considered in the broader financial stability discourse.

## **6. DeFi and Financial Stability: Addressing Regulatory Challenges**

After demonstrating the increasing linkages between DeFi and TradFi and examining the potential and conditional risks that DeFi may pose to financial stability, this research identifies two regulatory priorities to mitigate the threat that DeFi may pose to financial stability: the need for effective monitoring and supervision of DeFi's rapid evolution and the importance of fostering international cooperation. These priorities are critical to addressing systemic vulnerabilities without suffocating innovation or mischaracterising DeFi as inherently destabilising. Effective monitoring ensures that regulators can track the dynamic developments within DeFi, while supervision provides a framework to mitigate risks such as market instability and regulatory arbitrage. The global nature of DeFi emphasizes the necessity of coordinated international efforts to harmonize regulatory approaches and close jurisdictional gaps. It is important to point out that this research does not engage with the broader debate on whether DeFi should be regulated, as this issue has been thoroughly discussed in the existing literature. Instead, it focuses on how regulatory priorities can be shaped to enhance stability and resilience in a financial ecosystem increasingly influenced by DeFi. This focused approach allows the article to focus on the most pressing issues directly linked to DeFi's impact on financial stability insofar as those risks have been identified or reasonably extrapolated from comparable historical patterns in TradFi. By narrowing the scope, the paper aims to provide actionable insights into the specific regulatory measures needed to address DeFi's distinct risks, such as its rapid pace of innovation and growing interconnectedness with traditional financial systems. This strategic focus avoids becoming involved in the broader and more contentious debate on whether DeFi should be regulated, a topic that often involves divergent views among policymakers, regulators, and industry stakeholders.

### 6.1 Monitoring and Supervision

Monitoring DeFi's evolution is crucial to preventing potential disruptions to the financial system. Although DeFi has not yet triggered a systemic event, a precautionary approach to regulatory monitoring is warranted given its accelerating growth and integration with traditional financial channels. Proactive monitoring enables regulators to detect emerging threats, such as runs on stablecoins or concentrated market exposures, before they escalate into broader financial instability. Consistent oversight also helps build trust in the DeFi ecosystem by ensuring that risks are identified and mitigated, promoting innovation and resilience within the financial sector.<sup>179</sup> However, monitoring DeFi faces various challenges due to its decentralised and rapidly evolving nature, complicating efforts to track its activities effectively. First, DeFi suffers from significant issues related to transparency and data consistency.<sup>180</sup> The decentralised nature of DeFi platforms often results in fragmented and insufficient datasets, making it challenging to obtain a precise and reliable picture of activities within the ecosystem. These issues are further compounded when examining the interconnections between DeFi and TradFi, where data is inconsistent and lacks standardisation. This ambiguity hampers the ability of regulators and market participants to fully understand the risks and dependencies, potentially obscuring vulnerabilities that could destabilize the broader financial system. As mentioned earlier, the degree to which DeFi vulnerabilities impact financial stability heavily depends on its interactions with TradFi and the wider real economy.<sup>181</sup> Monitoring these interactions is particularly challenging, as it necessitates collecting information from both the DeFi ecosystem and external sources. Participants may often be reluctant to reveal their activities in the DeFi space unless they are required by law. Additionally, much of the critical data needed to track these vulnerabilities is not recorded on the blockchain, making it quite difficult to access and analyse.<sup>182</sup>

Secondly, an important challenge arises from the large volume of off-chain transactions: those that occur outside the public distributed ledgers. These transactions, which include activities on

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<sup>179</sup> Arner, Auer & Frost, *supra* n. 10.

<sup>180</sup> Financial Stability Board, *Assessment of Risks to Financial Stability from Crypto-assets* (2022) <https://www.fsb.org/2022/02/assessment-of-risks-to-financial-stability-from-crypto-assets/>.

<sup>181</sup> Georg Lorenz, *Regulating Decentralized Financial Technology: A Qualitative Study on the Challenges of Regulating DeFi with a Focus on Embedded Supervision* Stanford Journal of Blockchain Law & Policy (2024) <https://stanford-jblp.pubpub.org/pub/regulating-defi/release/1>.

<sup>182</sup> Financial Stability Board, *supra* n. 161.

centralised platforms, are not recorded on the blockchain, limiting the scope of visibility into the market's full activity.<sup>183</sup> Therefore, relying solely on on-chain data provides an incomplete and potentially misleading picture of the entire DeFi ecosystem. This lack of comprehensive data is particularly critical for understanding the broader implications of DeFi, as off-chain transactions often involve substantial financial flows and interactions that are essential to assessing systemic risks and market dynamics.

Lastly, certain DeFi trading and lending platforms may have incentives to manipulate their reported data to enhance the perceived importance of their platforms and attract greater trading volumes or investments.<sup>184</sup> By manipulating data such as transaction volumes, liquidity, or user activity, these platforms can create a distorted view of their market position and influence. This risk is further worsened by market incentives that prioritize growth and competitiveness over transparency and accountability. Further, participants operating outside existing regulatory frameworks, or in deliberate non-compliance with them, increase the likelihood of market manipulation or distorted data.<sup>185</sup> Such practices may not present an immediate systemic threat, but they may undermine trust in the DeFi ecosystem and pose significant risks to financial stability by concealing vulnerabilities and promoting conditions for systemic shocks.

The challenges of monitoring DeFi's activities and interactions with TradFi are further exacerbated by its decentralised structure, the absence of traditional intermediaries, and the complexity of the underlying technological innovations. These factors make regulatory oversight inherently difficult and create gaps in supervision. Depending on the jurisdiction, these challenges may be combined with existing regulatory gaps. Many features of DeFi are fundamentally incompatible with traditional regulatory frameworks, which are primarily designed for systems centred around financial intermediaries.<sup>186</sup> Since intermediaries are largely absent in decentralised finance, it

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<sup>183</sup> Bank for International Settlements, *DeFi Risks and The Decentralisation Illusion* (2021) [https://www.bis.org/publ/qtrpdf/r\\_qt2112b.pdf](https://www.bis.org/publ/qtrpdf/r_qt2112b.pdf).

<sup>184</sup> For example, in August 2022, reports emerged that leading developers of the Solana blockchain were artificially boosting Solana's Total Value Locked (TVL) by repeatedly counting the same cryptoasset. See, the Crypto Times, *Meet the people behind the fake TVL of 7.8B in Solana* (2022) <https://www.cryptotimes.io/2022/08/05/founders-revealed-to-pump-tvl-on-solana-launch-sybil-attack/>.

<sup>185</sup> Forbes, *More Than Half Of All Bitcoin Trades Are Fake* (2022) <https://www.forbes.com/sites/javierpaz/2022/08/26/more-than-half-of-all-bitcoin-trades-are-fake/>.

<sup>186</sup> Ferreira, *supra* n. 6.

becomes difficult to identify specific entities or individuals who can be subject to regulatory oversight.<sup>187</sup> This incompatibility complicates efforts to monitor or supervise DeFi constructs within the parameters of existing oversight structures. Additionally, the absence of a clearly accountable entity in many DeFi arrangements makes the enforcement of existing regulations particularly challenging, hindering effective supervision and governance.<sup>188</sup> Reintroducing intermediaries into DeFi would undermine its foundational principles while also introducing the vulnerabilities, inefficiencies, and costs typically associated with traditional financial intermediaries. This means DeFi systems would lose their decentralised nature, which reduces the risk of a single point of failure. In response to these challenges, this research argues that implementing regulatory instruments into the technological infrastructure could serve as an effective approach to monitoring and supervising DeFi systems and activities. This suggests that supervision needs to evolve alongside technological developments.

This research identifies a significant opportunity in leveraging RegTech (Regulatory Technology), which encompasses the use of technology for regulatory compliance, monitoring, supervision, as well as infrastructure and system design.<sup>189</sup> RegTech can be instrumental in promoting regulatory compliance and mitigating the financial stability risks linked to DeFi. Importantly, RegTech solutions are developed to deliver automated tools for compliance, risk management, and reporting in financial services, enabling efficient adherence to regulations and reducing risks in a rapidly evolving landscape.<sup>190</sup> Therefore, to enhance supervision and enforcement in a decentralised context, public authorities should develop technology-driven regulatory and supervisory frameworks. This, for instance, could involve "embedded supervision" a regulatory approach where compliance in decentralised markets is automatically monitored through direct access to the market's ledger. Embedded supervision can be viewed as an automated approach to compliance, monitoring, and oversight, where the system itself is used to implement, track, and enforce

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<sup>187</sup> International Organization of Securities Commissions, *Final Report with Policy Recommendations for Decentralized Finance (DeFi)* (2023) <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD754.pdf>.

<sup>188</sup> Ibid.

<sup>189</sup> Teichmann, Boticiu & Sergi, *supra* n. 13.

<sup>190</sup> Ben Charoenwong et al, *RegTech: Technology-Driven Compliance and Its Effects On Profitability, Operations, And Market Structure* 154 *Journal of Financial Economics* 1,8 (2024) .

compliance requirements.<sup>191</sup> To successfully implement this approach, policymakers must build their expertise and enhance their capacity to fully understand DeFi. This involves identifying the necessary data, specialised knowledge, and resources required to collect and analyse comprehensive information regarding the scale, scope, and potential impact of DeFi on financial stability. This also requires avoiding over-engineering regulatory responses before a robust, evidence-based understanding of systemic exposure is achieved. By doing so, they can better assess the risks and benefits associated with DeFi and craft more informed, effective regulations.

## *6.2 Promoting International Cooperation*

Given the cross-border nature of DeFi products, services, activities, and arrangements, promoting international cooperation is essential to addressing its potential impact on financial stability. To illustrate, DeFi projects often operate across multiple jurisdictions, falling under various national and regional authorisation and supervision regimes.<sup>192</sup> Each regulator involved brings its perspective, mandate, and legal framework, imposing different requirements and conditions. This can lead to a fragmented and inconsistent regulatory environment, where overlaps and gaps in oversight prevent effective risk management.<sup>193</sup> Such fragmentation poses substantial challenges to addressing financial stability risks associated with DeFi, as the lack of harmonized standards may create regulatory arbitrage opportunities. At the same time, this fragmented regulatory landscape could undermine some of DeFi's core advantages, such as efficiency, global accessibility, and seamless operations across borders. This creates a fragmented environment where both DeFi's promise and its risks are poorly managed, highlighting the urgent need for coordinated international regulatory frameworks to mitigate these challenges and safeguard financial stability. Therefore, regulators should establish robust mechanisms for cooperation and information sharing with authorities in other jurisdictions.<sup>194</sup> These frameworks should enable regulators to assist broadly in enforcement efforts and the authorisation and oversight of DeFi market participants. Further, such collaboration should foster a unified understanding of DeFi activities and associated risks across borders. Timely and efficient exchange of information is

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<sup>191</sup> Raphael Auer, *Embedded Supervision: How to Build Regulation Into Decentralised Finance* (2022) BIS Working Papers No 811 <https://www.bis.org/publ/work811.htm>.

<sup>192</sup> Lorenz, *supra* n. 162.

<sup>193</sup> Zetzsche, Arner & Buckley, *supra* n. 6.

<sup>194</sup> International Monetary Fund, *Why International Financial Cooperation Remains Essential* (2017) <https://www.imf.org/en/Blogs/Articles/2017/03/23/why-international-financial-cooperation-remains-essential>.

particularly crucial in addressing threats to financial stability or mitigating potential harm to investors.

Regulators should also promote robust cooperation and information-sharing frameworks to enhance the effective oversight of DeFi activities. Leveraging existing arrangements to their maximum potential should be a priority to ensure they are fully utilized to address the complexities of DeFi's cross-border operations.<sup>195</sup> Where current mechanisms prove insufficient, regulators should consider establishing new bilateral or multilateral agreements tailored to the unique challenges posed by DeFi. These new frameworks could expand the scope of cooperation to include additional subject areas or authorities, facilitating comprehensive and coordinated supervision. Such efforts are crucial for addressing the dynamic and borderless nature of DeFi, providing effective regulatory oversight and reducing systemic risks across jurisdictions. While a multinational convention or treaty could provide a more unified approach, its feasibility and effectiveness may be limited by the differing regulatory priorities and legal systems across jurisdictions.

It is significant to emphasize that regulators should actively participate in the initiatives of international organisations such as the Financial Stability Board (FSB), the Bank for International Settlements (BIS), and the International Organization of Securities Commissions (IOSCO) to establish robust regulatory frameworks for the DeFi sector.<sup>196</sup> These global forums play a critical role in promoting coordinated approaches to managing the systemic risks associated with DeFi and ensuring that regulatory gaps are addressed comprehensively. The FSB, for instance, has published reports highlighting the financial stability risks associated with DeFi, particularly focusing on the potential for market fragmentation, and the lack of transparency in decentralised platforms.<sup>197</sup> The BIS has actively explored the technological underpinnings of DeFi and provided insights into potential vulnerabilities and opportunities for embedding regulatory mechanisms directly into decentralised systems.<sup>198</sup> Similarly, IOSCO has focused on investor protection in the

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<sup>195</sup> International Organization of Securities Commissions, *supra* n. 168.

<sup>196</sup> Global Digital Finance, *DeFi: Moving the Dialogue on Standards and Regulation Forward* (2022) [https://www.gdf.io/wp-content/uploads/2022/07/DeFi-Report\\_26.07.22.pdf](https://www.gdf.io/wp-content/uploads/2022/07/DeFi-Report_26.07.22.pdf).

<sup>197</sup> The Financial Stability Board, *supra* n. 36.

<sup>198</sup> Bank for International Settlements, *supra* n. 42.

DeFi space, issuing guidance on identifying and mitigating risks related to fraud, market manipulation, and the lack of transparency on DeFi platforms.<sup>199</sup> These initiatives collectively underscore the importance of international cooperation in establishing consistent, effective regulatory frameworks to ensure the resilience and stability of the global financial system. In addition, regulators should explore the potential future roles that DeFi projects, platforms, and ecosystems could play in cross-border regulatory supervision and oversight. Particular attention should be given to their application in vital areas such as international payments, securities clearing and settlement, trade finance, and other essential financial services. This proactive engagement aligns regulatory approaches across jurisdictions and ensures that DeFi innovations contribute constructively to the stability and efficiency of the global financial system.

While DeFi has not yet shown the scale or impact required to trigger a systemic crisis, the increasingly blurred lines between DeFi and TradFi justify proactive, proportionate, and collaborative regulatory responses. The focus must remain on ensuring that risk-mitigating tools evolve in parallel with technological innovation.

## **7. Conclusion**

This article has examined DeFi's potential to challenge the stability of the global financial system, shedding light on its distinctive vulnerabilities and the systemic risks it introduces. It delved into the regulatory challenges arising from DeFi's decentralised nature, emphasising the need to rethink traditional regulatory approaches to protect financial stability in an increasingly digitalised financial ecosystem. While the dynamic growth of DeFi has marked the beginning of a new era of financial innovation, it also introduces complex risks that challenge financial stability. The decentralised and technology-driven nature of DeFi represents a fundamental shift in the financial landscape, raising questions about whether the existing regulatory frameworks, designed for traditional finance, can effectively address these emerging risks. This article has shown that DeFi's vulnerabilities, while sometimes mirroring those of TradFi, often manifest uniquely due to its governance structures and operational models. These distinctions demand a tailored approach to oversight and regulation, moving beyond traditional models to address the unique risks DeFi poses.

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<sup>199</sup> International Organization of Securities Commissions, *supra* n.24.

Regulators, therefore, will have to strike a careful balance between containing DeFi risks and allowing innovation to thrive.

In this context, the role of stablecoins within DeFi warrants special attention. As the paper argued, their foundational position within DeFi ecosystems and their potential to trigger systemic risks through runs necessitate the development of tailored regulatory strategies. Differentiating stablecoins by their reserve mechanisms and operational structures can enable more precise regulation, ensuring that safeguards are proportionate to the specific risks they pose. This comprehensive approach is critical to preventing disruptions in stablecoin markets from spreading into broader financial instability.

The paper has also highlighted that, while mechanisms such as overcollateralization and automated liquidation provide some level of built-in risk management within DeFi, these features do not offer the legal certainty or operational resilience demonstrated in traditional finance. Particularly, their procyclical behaviour, such as liquidation spirals and recursive borrowing, can amplify volatility under stress, as evidenced in historical episodes like the March 2020 'Black Thursday' event. The absence of regulatory oversight and enforceability further undermines their reliability in crisis scenarios.

Building on this, the paper's original suggestions for addressing the potential impacts of DeFi on the stability of the financial system include effective monitoring and supervision of DeFi's rapid evolution and fostering international cooperation. It emphasizes that proactive monitoring is crucial for identifying emerging risks before they destabilize the financial system. Moreover, integrating regulatory mechanisms into DeFi's technological infrastructure, through RegTech, presents a promising approach to achieving this goal. The article also stresses that DeFi's cross-border nature means risks in one jurisdiction can rapidly spread to others, emphasising the need for coordinated global responses. International coordination is essential to prevent regulatory arbitrage, ensure consistent enforcement, and mitigate risks that extend beyond national borders. Creating robust frameworks for information sharing, enforcement collaboration, and joint-supervision will be crucial in effectively managing the systemic risks posed by DeFi.

While the Basel Committee's 2025 prudential standards on cryptoasset exposures represent an important step in addressing banking-sector risks, the article has shown that they fall short of providing a comprehensive safeguard. Their limited scope, rigid treatment of permissionless blockchains, and inability to reach systemically important non-bank actors reduce their effectiveness in addressing contagion risks that may arise from increasing TradFi–DeFi interdependencies.

The central contribution of this article has been to foreground financial stability as the main analytical lens through which DeFi should be considered. By linking DeFi's vulnerabilities to systemic risks, it shifts the debate beyond consumer protection or innovation and positions DeFi within the wider trajectory of prudential regulation and global financial governance. In doing so, it suggests a framework for regulators to anticipate, rather than simply react to, emerging crises.

While this article addresses a critical gap in legal scholarship by focusing on financial stability, DeFi also presents broader legal and ethical challenges, such as data privacy, consumer protection, and the accountability of decentralised governance structures. For example, the transparency inherent in blockchain systems often conflicts with data protection laws. This raises questions about preserving privacy rights in a decentralised ecosystem. Similarly, the absence of centralised intermediaries in DeFi exposes consumers to risks such as fraud, technical failures, and financial losses, with limited avenues for recourse. The accountability of decentralised governance structures, especially in systems managed by decentralised autonomous organisations (DAOs), further complicates the regulatory landscape, as traditional legal frameworks struggle to address responsibility and equitable participation issues. Future research should explore these aspects in greater depth, providing a more comprehensive understanding of DeFi's impact on the financial ecosystem and offering pathways for addressing its complex regulatory and ethical challenges.