Potential Points of Failure for Stablecoins

Did the Silicon Valley Bank collapse lead to DeFi instability?

Decentralized Treasury Working Group

blockchain
governance
initiative
network

The Global Network for Blockchain Stakeholders™

This study is a work product of the Decentralized Treasury Working Group of BGIN.

Executive Summary

This paper analyzes the impact of the collapse of Silicon Valley Bank on stablecoins and the broader decentralized finance (DeFi) ecosystem in March 2023. Understanding the unfolding of events and identifying commonalities between classic and emerging financial systems will help harmonize balance between innovation and stability.

The depegging of the stablecoin USDC, following the collapse of Silicon Valley Bank, caused instability in the DeFi ecosystem. Concerns arose about whether Circle could redeem customers 1:1 USDC for USD having parts of its fund in Silicon Valley Bank.

During a period of confusion in the crypto-asset ecosystem, USDC experienced a notable depegging, with its value dropping to $0.87 at one point. However, after Circle announced its commitment to cover any deficit resulting from Silicon Valley Bank's closure, the price of USDC rebounded to $0.97 on the same day. Additionally, following the U.S. Department of Treasury, Federal Reserve, and Federal Deposit Insurance Corporation (FDIC) announcement of backstopping the collapse of Silicon Valley Bank on March 12, the value of USDC on secondary markets recovered to $0.99.

The depegging of USDC also affected another notable stablecoin called DAI, which is governed by MakerDAO. DAI is partly backed by USDC, and the instability of USDC caused instability for DAI as well. MakerDAO implemented emergency measures to address the depegging of DAI. The incident also had an impact on centralized exchanges (CEXs) and decentralized exchanges (DEXs). Coinbase and Binance suspended USDC conversions due to high inflows of USDC, leading to a significant migration of USDC from CEXs to DEXs. Overall, the incident highlighted the risks and challenges associated with stablecoins.

Stablecoins aim to maintain their value stability through three main structures: collateral backing, algorithm-based, and/or the credibility of the stablecoin's issuer or governing body; which is also crucial in establishing and enforcing rules to maintain the stablecoin's value.

However, the challenge of maintaining stability is not unique to stablecoins; it is a classic problem which can be seen prominently in cases of fiat currency such as the Hong Kong Dollar and Swiss Franc. Additionally, the concentration of economic power and anti-competitive effects are also seen in traditional financial markets. At the same time, while the HKD's mechanism provides stability, it does not generate yield. Stablecoins have the potential to earn yields but face risks due to the backing assets and issuer credibility. Consequently, the "safe money" model, which aims to generate profits, can be difficult to achieve in this context.

The depegging of stablecoins revealed various risks, including systemic risk, market volatility, reputation risk, liquidity risk, counterparty risk, and regulatory risk. It also revealed the risks in traditional finance have extended to stablecoins and the DeFi ecosystem through their interconnected nature. It is essential to carefully manage the risks associated with stablecoins, ensure transparency and credibility of issuers, and take appropriate measures to address potential risks while considering the potential benefits they offer.

Evaluating the tier level of custodians and addressing potential bank insolvency is crucial. Stablecoins face interconnectedness risks and can create contagion effects in the DeFi ecosystem. Diversifying interactions, implementing circuit breakers, and swift responses are important. Furthermore, the global 24/7 nature of stablecoin transactions introduces new challenges compared to traditional finance, necessitating swift and timely responses.

To effectively respond to emergency situations and maintain stability in a decentralized financial system, it is crucial to consider lessons from traditional finance while also adapting to the unique characteristics of stablecoin transactions.

Stablecoins' impact on financial stability raises concerns, especially in the event of a run-on or failure. Managing credit risk, diversifying banking partners, and addressing interconnectedness are vital, along with effective crisis response and regulatory oversight. To improve stablecoin value stability, potential solutions include diversifying banking partners and backing assets, implementing sophisticated risk management strategies, enhancing issuer credibility through transparent governance and audits, and drawing insights from traditional finance models. While stablecoins face risks associated with credit, liquidity, and maturity mismatch, backing them with central bank reserves can mitigate these risks. The relationship between stablecoins backed by central bank reserves and Central Bank Digital Currencies (CBDCs) can be complementary, with stablecoins serving as a bridge between the traditional financial system, the emerging CBDC ecosystem and decentralised finance.

By taking a multi-stakeholder approach, the DeFi ecosystem can become more resilient and sustainable. BGIN is dedicated to developing initiatives and protocols for stability and innovation. Open discussions and learning from stakeholders' experiences are vital for responsible technology use.

Introduction

In March 2023, the failure of Silicon Valley Bank resulted in growing concerns about the stability of USDC and ultimately led to a depegging of the stablecoin. This, in turn, triggered a depegging of other stablecoins including DAI. The purpose of this paper is to gain a comprehensive understanding of the events that transpired, identify potential points of failure, and the risks that were revealed. The interconnectivity of the crypto-asset ecosystem caused a cascade effect, with each event leading to another. Hence, it is crucial to examine this incident, learn from it, and understand its potential implications for the future. The paper will analyze what occurred, the associated risks that were revealed, and the future implications of this incident.

While there has been talk about the impact of crypto market volatility on traditional finance, this paper aims to examine a specific incident in traditional finance that made an impact on the crypto market and directly or indirectly resulted in stablecoin volatility.

The structure of this paper is as follows. Sections 1-4 set the stage for the paper. Section 5 provides an explanation of stablecoins. Section 6 examines the observed effects and risks of stablecoins following the collapse of Silicon Valley Bank. Section 7 highlights a new risk that was revealed compared to classic problems. Section 8 discusses the potential point of failure that led to stablecoin depegging. Section 9 explores the potential future implications of this incident and present recommendation. Section 10 delves into the role of BGIN given the risks and issues that surfaced. Section 11 concludes.

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1. Scope

This paper discusses the stability of stablecoins in the broader context of decentralized finance (DeFi). It analyzes recent instability events in the DeFi ecosystem, which were triggered by the collapse of a traditional financial institution, and how they impacted stablecoins. The aim of this paper is to explore potential risks and challenges associated with stablecoins and DeFi more broadly and to provide solutions and frameworks for promoting stability and mitigating risks. Additionally, the paper evaluates the role of industry players, including BGIN, in promoting stability and innovation within the DeFi ecosystem. The analysis presented in this paper is based on publicly available data, industry reports, and interviews with key stakeholders in the DeFi ecosystem.

2. Normative Reference

This document has no normative reference.

3. Terms and Definitions

This document uses the following terms as the shortcut for more complete wording provided as the definition. When the term appears within this document, it should be read as being replaced by the definition.

3.1
algorithm-based stablecoins
stablecoin that purports to maintain a stable value via protocols that provide for the increase or decrease of the supply of the stablecoins in response to changes in demand
[Source: FSB (2020) modified]

3.2
asset-linked stablecoin
stablecoin that purports to maintain a stable value by referencing real or financial assets or other crypto-assets
[Source: Cohan(2017)]

3.3
centralized exchange
a crypto-asset trading platform that facilitates the buying and selling of crypto-assets, either for fiat currencies, or for another digital asset. The platform functions as an intermediary and sometimes provides custody and other services.

[Source: FSB (2023)]

3.4

decentralized application (dapp)

application built on a decentralized network that combines a smart contract and a frontend user interface
[Source: Ethereum.org (2022)]

3.5

decentralized autonomous organization (DAO)

a blockchain-based system that enables people to coordinate and govern themselves mediated by a set of self-executing rules deployed on a public blockchain, and whose governance is decentralised
[Source: Hassen and Filippi(2017)]

3.6

decentralized finance (DeFi)

a set of alternative financial markets, products and systems that operate using crypto-assets and "smart contracts" (software) built using distributed ledger or similar technology. [Source: FSB (2023)]

3.7

decentralized financial system

financial system that could be the result of decentralized financial technology [Source: Based on FSB (2019)]

3.8

decentralized financial technologies

technologies that may reduce or eliminate the need for one or more intermediaries or centralised processes in the provision of financial services
[Source: FSB (2019)]

3.9

decentralized exchange

arketplaces built using distributed ledger or similar technology where transactions can occur directly between crypto-asset traders
[Source: FSB (2023)]

3.10

governance body

body responsible for establishing and monitoring the rules governing the stablecoin arrangement, which would cover, among other issues, the types of entities that could be involved in the arrangement, the protocol for validating transactions, and the manner in which the value of the stablecoin is "stabilised"

[Source: FSB (2020)]

3.11

smart contract

collection of code and data (sometimes referred to as functions and state) that is deployed using cryptographically signed transactions on the blockchain network. The smart contract is executed by nodes within the blockchain network; all nodes must derive the same results for the execution, and the results of execution are recorded on the blockchain

[Source: NIST (NISTIR 8202)]

3.12

stablecoin

crypto-asset that aims to maintain a stable value relative to a specified asset, or a pool or basket of assets

[Source: FSB (2020)]

4. Abbreviations and Symbols

In this document, the following abbreviations and symbols are used.

BCP - Business Continuity Planning
BGIN - Blockchain Governance Initiative Network
CBDC - Central Bank Digital Currency
CEX - Centralized Exchanges
dapp - Decentralized Application
DAO - Decentralized Autonomous Organization
DeFi - Decentralized Finance
DEX - Decentralized Exchanges
FDIC - the Federal Deposit Insurance Corporation
FSB - Financial Stability Board
HKMA - Hong Kong Monetary Authority
MMF - Money Market Fund
OCC - the Office of the Comptroller of the Currency
OEF - Open-End Fund

PSM - Peg Stability Module
PWG - President's Working Group on Financial Markets
RWA - Real World Asset

5. What is a stablecoin?

A stablecoin is a type of digital asset designed to keep its value steady in relation to a particular asset or a combination of assets. The term "stablecoins" encompasses a wide range of methodologies to maintain value stability. Stablecoins use algorithms or other methods to maintain a stable market value, such as adjusting their supply based on changes in demand (FSB, 2020). The market value of a stablecoin is usually influenced by the value of chosen underlying assets. Additionally, various definitions of the term "stablecoin" are currently discussed, and the term does not always have a clearly defined legal or regulatory classification. Table 1 presents one way to classify different stablecoins.

Table 1 Types of stablecoins

Type	Description	Examples
Tokenized cash	Tokens fully-reserved with cash & cash equivalent instruments (e.g. T-bills and other level 1 HQLA with less than 90 days of maturity)	USD Coin (USDC), Binance USD (BUSD), Paxos Dollar (USDP).
Other fiat-asset backed	Tokens reserved with fiat assets of varying credit qualities and liquidity.	Tether (USDT)
Crypto-(over)collateralized	Reserves are over collateralized with crypto asset and/or tokenized fiat assets that do not self-reference to the stablecoin in supply determination.	Dai, Fei
Algorithmic/ endogenously collateralized	Stablecoins that are fully or partially backed by a second more volatile reference coin. The supply of the reference coin is pragmatically determined based on the primary coin.	FRAX

(Source: Excerpt from Liao (2022) and edited by the author)

Some jurisdictions have defined specific methods for stablecoins, such as the "e-money token" and "asset-referenced token" in the EU and the "electronic payment instrument" in

Japan.[1] These definitions are meant to provide clarity and regulatory oversight for stablecoins operating within their respective jurisdictions.

Determining whether stablecoins are considered means of payment or securities is crucial, as different regulatory measures apply to each category. It is important to avoid a middle ground where stablecoins do not fall under any regulatory clarity.[2] Clear regulatory guidelines will help ensure that stablecoins operate within a transparent and secure framework and that users can trust their stability and reliability.

This paper aims to analyze stablecoins that are asset-linked and backed by tangible or intangible assets, such as financial instruments or other crypto-assets. Specifically, this study delves into the impact of the March 2023 bank run on the price stability of USDC, a stablecoin which is fully-backed by USD, and Circle, the issuer company, that claims to redeem USDC one for one to USD. A stablecoin value is maintained through its pegging to a specific fiat currency using a reserve of the fiat currency itself and of low-risk liquid financial instruments, typically described as "high quality liquid assets", denominated in the same fiat currency. Additionally, this study explores the ripple effect of this bank run on other ecosystems that were indirectly impacted.

6. Effects and Risks of Stablecoin and DeFi
(What happened after the Silicon Valley Bank Collapse?)

<Key Points>
- Understanding what happened and the root cause.
- Market response and panic.
- Emergency measures.
- Direct and spillover effect and risk through stablecoin.
    - Banking and stablecoin/DeFi interaction.
    - Depegging of stablecoins (USDC).
    - The domino effect on non-USDC stablecoins which were backed with USDC, such as DAI.
    - Huge trading volume the volume stopped central exchanges (Coinbase, Binance restricted redemption).
    - Other spillover channels.
- Outcome and ongoing situation.

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[1] In Japan, the term "e-money token" refers to a specific type of electronic money that is issued by certain companies, whereas "prepaid payment instruments" encompass a broader range of prepaid payment products available from various providers.

[2] There was a comment during BGIN's discussion that a new category with regularity clarity could be created.

6-1 Depegging of USDC following the Silicon Valley Bank Collapse

Silicon Valley Bank faced a bank run in March 2023. A bank run is a situation where a large number of depositors of a bank attempt to withdraw their funds simultaneously due to concerns about the bank's solvency or stability. It can quickly lead to a liquidity crisis for the bank, as it may not have sufficient cash reserves to meet all withdrawal requests.

Causing overall fear of Silicon Valley Bank not being able to honor bank deposits. Circle the issuer of USDC, had part of its funds held in Silicon Valley Bank and the bank run raised concerns about whether Circle could redeem customers 1:1 USDC for USD.[3] It is important to note that Circle has maintained transparency by consistently disclosing the location of the reserve backing USDC and by announcing its exposure to Silicon Valley Bank. These concerns seemingly led to a loss of confidence in USDC and potentially triggered a flight from the stablecoin to alternatives. As a result theshort term confusion and panic in the crypto-assets ecosystem, most notably the depegging of the stablecoin USDC falling to $0.87 cents on the secondary market was observed (Figure 1).

Following Circle's announcement of backing any deficit resulting from Silicon Valley Bank's closure, the price of USDC rebounded to $0.97 on the same day. Additionally, after the U.S. Department of the Treasury, Federal Reserve and Federal Deposit Insurance Corporation (FDIC) announced their backstop of Silicon Valley Bank Collapse on March 12, the value of USDC on secondary markets further increased to $0.99. These details highlight the short-term depegging of USDC during that period.
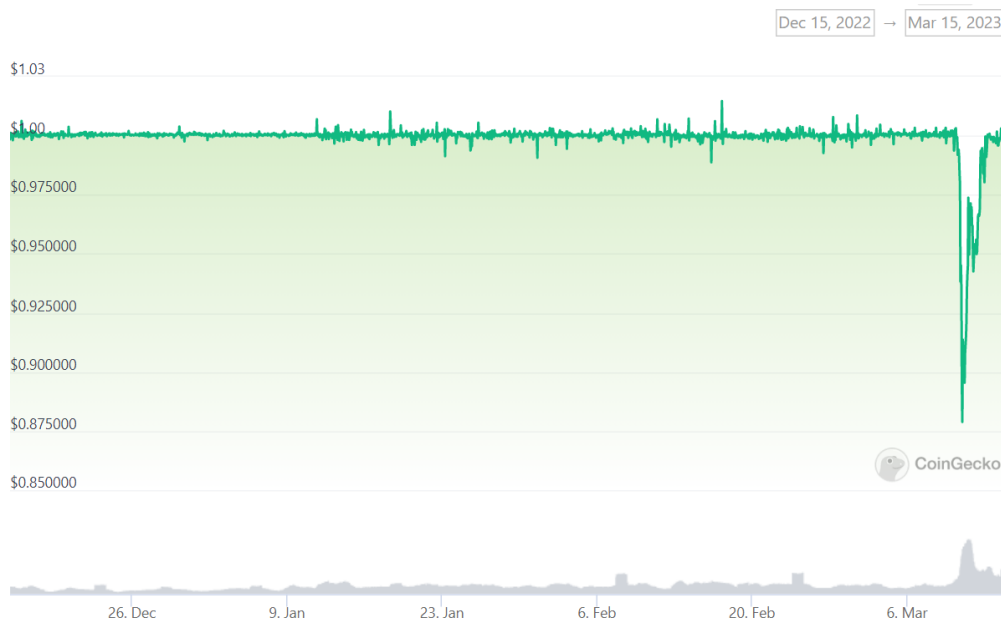

Figure 1 USDC (December 15th to March 15th)

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[3] Circle does not do anything to "maintain the value of USD"; USDC has price parity to the dollar because all USDC in circulation is backed by the equivalent value of U.S. dollar denominated assets held as reserves for the benefit of USDC holders.

As of 13th March, USDC was fully backed by a combination of cash (23% ($9.7 billion)) and U.S. Treasuries (short term Treasuries with maturation periods of 90 days or less) (77% ($32.4 billion)) (Team Circle, 2023). Furthermore, as of 11th March 2023, $3.3 billion of USDC's cash reserves (8% of the total reserve, 34% of the total cash reserve) remained in the Silicon Valley Bank (Team Circle, 2023) (Figure 2).

Circle ✅
@circle

1/ Following the confirmation at the end of today that the wires initiated on Thursday to remove balances were not yet processed, $3.3 billion of the ~$40 billion of USDC reserves remain at SVB.

7:11 PM · Mar 10, 2023 · **5.9M** Views

Figure 2 Announcement by Circle (March 10th)

Polk (2023) reported that "[b]etween 10-15 March, net $4.46 billion USDC was redeemed. Daily redemptions were at yearly highs, with Coinbase the largest redeemer by far". To stop the panic spreading, Circle announced on March 11th that they have "initiated transfers of these funds to other banking partners" and that they will "cover any shortfall using corporate resources, involving external capital if necessary" should the Silicon Valley Bank not return 100% of the deposit and that any return might take some time (Team Circle, 2023). On March 13th, Circle announced that the cash reserves at Silicon Valley Bank were available and other cash reserves were held primarily at BNY Mellon. This announcement followed the FDIC's announcement that bank deposits at Silicon Valley Bank were guaranteed up to USD250K. As previously stated, these announcements corresponded with USDC fully regaining its peg to the dollar on the secondary market.

Garratt and Shin (2023) point out that the "[d]epartures from par value are common in the stablecoin world, despite market interventions by the issuers to prevent them" and that "[w]hile such departures can be small during normal times, even a small departure runs counter to the norm of singleness and introduces a wedge that can be magnified greatly during periods of stress." They examine what had happened to the stablecoin following the incident of the FTX and the Silicon Valley Bank collapse, stating that "[d]epartures from singleness are often triggered by events in the crypto market" (Figure 3).

FTX collapse

Silicon Valley Bank collapse
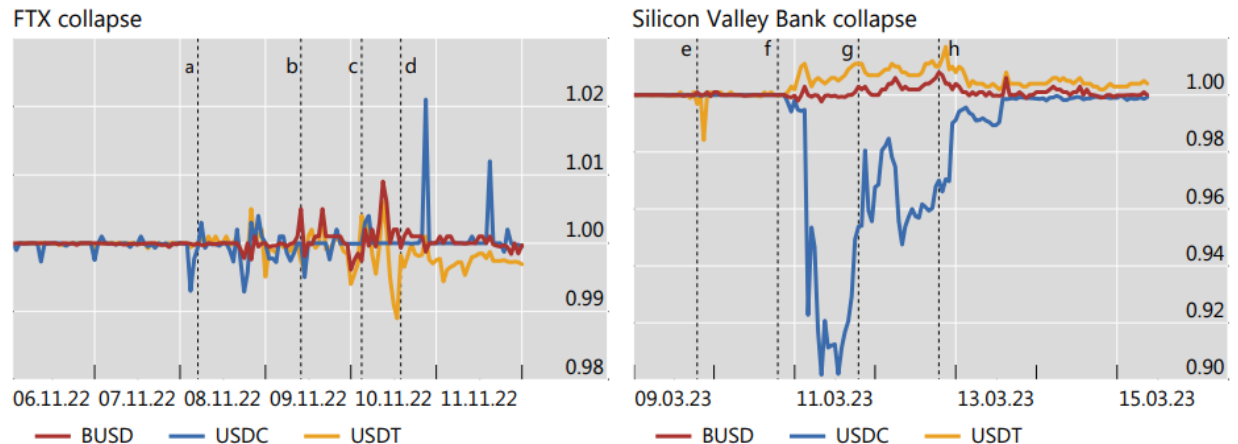
ᵃ FTX strikes an acquisition deal with Binance for its non-US business.   ᵇ Binance backs out of the deal.   ᶜ FTX CEO Sam Bankman-Fried apologises on Twitter.   ᵈ Bahamas securities regulator freezes FTX assets.   ᵉ Silicon Valley Bank announces that it will raise additional capital by selling stock.   ᶠ SVB Financial seeks a buyer. A few hours later, a California regulator shuts Silicon Valley Bank and appoints the Federal Deposit Insurance Corporation (FDIC) as receiver to take control of its parent company.   ᵍ Employees of Silicon Valley Bank offered 45 days of employment at 1.5 times their salary by the FDIC.   ʰ "Depositors will have access to all of their money starting Monday, March 13," the US Treasury, Federal Reserve and FDIC say in a statement, adding that no losses associated with the resolution of Silicon Valley Bank will be borne by the taxpayer.

Figure 3 FTX and Silicon Valley Bank collapses coincide with volatility in stablecoin prices (US Dollar)
(Source: Garratt and Shin (2023))

6-2 Contagion Effects on DAI and Reactions from MakerDAO

The depegging of USDC led to instability for another USD soft-pegged stablecoin, DAI, which is governed by MakerDAO (Figure 4).[4] DAI is reserved fully on-chain and is partly backed by USDC, which accounted for $2.6B (51.7%) of the total backing as of 12th April 2023, according to Makerburn.com (Figure 5).

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[4] MakerDAO is the governing body of DAI. For a definition on "governing body" see Section 3.
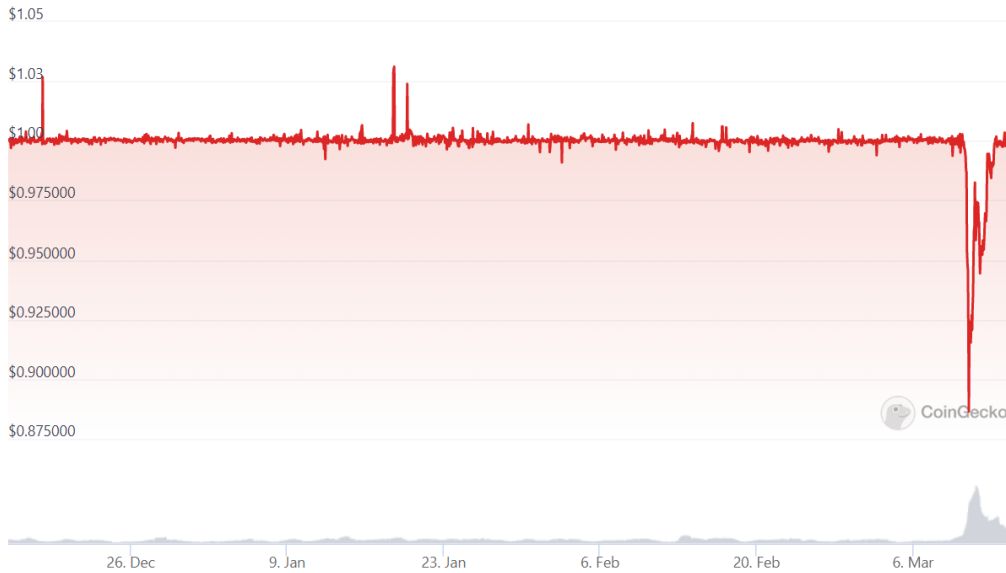
Figure 4. Price of DAI (15th December 2022 to 15th March 2023)
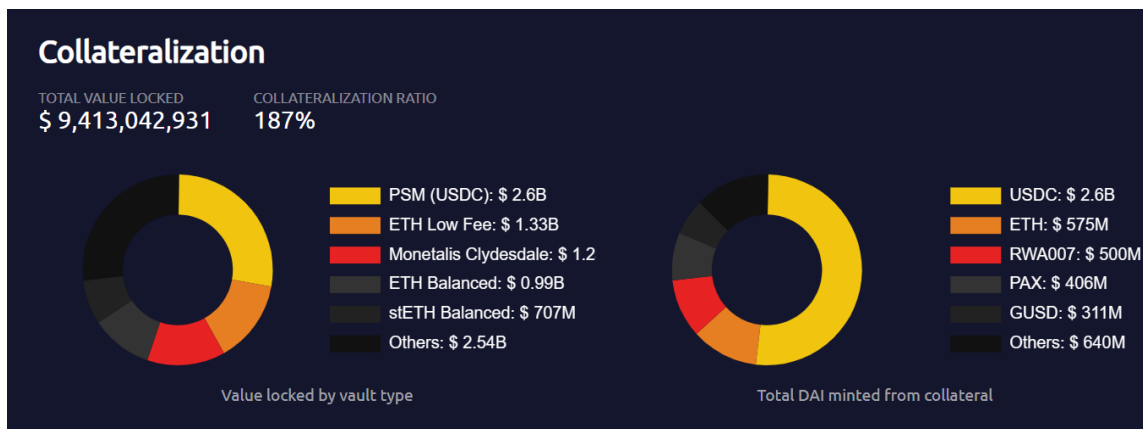
Figure 5 List of DAI Collateral (12th April 2023)
(Source: Makerburn.com)

To address the DAI depegging, an emergency Executive Vote was held and approved by MakerDAO, to adjust the relevant smart contract parameters on Ethereum. Smart contracts are self-executing agreements that power decentralized tokens, decentralized applications (dapps), and protocols. In this particular case, the most significant changes were approved to the Peg Stability Module (PSM), which helps DAI to maintain dollar parity, and to DAI's vaults and fees.

As a part of the emergency measures that were implemented, four USDC-exposed vaults with a collective Maximum Debt Ceiling of $350 million had their minting limits reduced to zero. Simultaneously, the PSM was amended to increase the minting limit for Paxos (USDP), another stablecoin. Specifically, the Paxos debt ceiling was raised from 450 million DAI to 1 billion DAI. MakerDAO also acted to mitigate risks arising from GUSD, Gemini's USD

stablecoin product, citing potential contagion risks that could impact Gemini owing to their "large uninsured bank deposit exposure" (MakerDAO forum, 11th March 2023).[5] Ultimately, MakerDAO deployed this set of parameter changes "with the purpose of limiting Maker's exposure to volatile centralized stablecoins and reinforcing the DAI peg" (MakerDAO, 2023).[6] The DAO published a succinct summary of their actions, and forward-looking measures, on 15th March 2023 (Box 1).

Box 1: Reaction of MakerDAO to the DAI depeg event (March 15th, 2023)

(1) A summary of the recent events:

On 10th March 2023, regulators took over Silicon Valley Bank due to a liquidity crisis. Circle disclosed that $3.3 billion of USDC reserves were deposited in the bank and could not be accessed due to weekend closure. Maker's Peg Stability Module (PSM) enables DAI-USDC swaps at a 1:1 fixed ratio and backs minted DAI with deposited USDC. As a result, the stablecoin market experienced a USDC sell-off over the weekend, leading to a slight depeg of USDC, affecting DAI's price.

Silicon Valley Bank exposure led to increased USDC inflows to the PSM, causing MakerDAO's USDC exposure to double to $4 billion over the weekend, which also affected DAI's price due to the PSM's 1:1 fixed exchange rate.

(2) Immediate actions:

An emergency vote proposed by the Risk Core Unit on Saturday, March 11, and executed on Monday, March 13, deployed a set of parameters to limit Maker's exposure to USDC and encourage diversification of PSM's stablecoin assets.

Additionally, this emergency vote reduced the Governance execution delay from the usual 48 to 16 hours, enabling Maker Governance to implement future changes faster.

The Risk Core Unit proposed a second executive vote, which is currently being voted on by Maker Governance and, if approved, is expected to execute the following change 16 hours from the time of approval:

> Implement a circuit breaker to deactivate all PSMs with an instant governance action that will be able to be executed immediately after governance approval. By employing the circuit breaker, Maker Governance will instantly set a specific PSM debt ceiling to zero if market conditions increase the risk of holding a specific stablecoin, thus preserving the DAI price.

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[5] https://forum.makerdao.com/t/emergency-proposal-risk-and-governance-parameter-changes-11-march-2023/20125 (last accesed on May 16, 2023)
[6] https://twitter.com/MakerDAO/status/1635329593384083477?s=20 (last accesed on May 16, 2023)

> **(3) Future measures to reinforce the DAI stability:**
>
> Going forward, MakerDAO Core Units are considering multiple proposals to limit MakerDAO's exposure to centralized stablecoins, such as:
>
> • Introducing PSM market-price swaps and redemption curves that will slow down the 1:1 swaps during times of emergency.
>
> • Switching a considerable portion of stablecoin reserves towards money market assets like US Treasury bonds, which are highly liquid assets and would be ready to protect DAI's price in case of a sell-off event. By further diversifying its reserves towards real-world assets and bonds, MakerDAO will increment its control over DAI's liquid backing. This diversification approach will expand MakerDAO's revenue channels and create opportunities to increase the Dai Savings Rate (DSR) and distribute those earnings to DAI holders.

(Source: MakerDAO (2023))

An interesting feature of MakerDAO's reaction was the decision to increase its exposure to Paxos. In the emergency proposal, MakerDAO justified the decision to increase USDP debt limits to 1 billion, saying that "Paxos has relatively stronger reserve assets versus other available centralized stablecoins, consisting primarily of US treasury bills, reverse repurchase agreements backed by US treasury bonds, insured bank deposits (placed through deposit broker networks to remain under FDIC limits), and privately insured bank deposits, with a relatively small portion of uninsured bank deposits per their latest reserves reports. They face the relatively lower potential for impairment versus other available stablecoins, but can still provide important backstop liquidity to prevent DAI from trading over the $1 target price and impacting liquidation safety in the event of a crypto market crash" (MakerDAO forum, March 11th, 2023).[7]

These decisions suggest that the DAO was more concerned with the risks arising from counterparty balance sheets (namely Circle and Gemini) than any regulatory or reputational risks that could be associated with USDP's issuer, Paxos. Notably, in the month prior to the depegging event, mainstream media reported that Paxos had been issued a Wells notice by the SEC, regarding another one of its products, the BUSD stablecoin, which is related to Binance but owned and issued by Paxos. In a statement, Paxos said that "[e]ffective February 21, Paxos will cease issuance of new BUSD tokens as directed by and working in close coordination with the New York Department of Financial Services," adding that it would "end its relationship with Binance for the branded stablecoin." [8]

In the past, DAI was often depegging to the upside (trading above $1), and increasing the stability fees as high as 5% in an attempt to fix this, which caused DAI to lose market share. The PSM kept interest rates low (and low volatility of interest rate spikes) and competitive with other players in the market. This was the solution to the stability fees issue. Between late 2019 and

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[7] https://forum.makerdao.com/t/emergency-proposal-risk-and-governance-parameter-changes-11-march-2023/20125
[8] https://www.cnbc.com/2023/02/13/paxos-ordered-to-cease-minting-binance-stablecoin-by-new-york-regulator.html

early 2020, there were numerous fluctuations in the interest rate, with rates hovering around 1.05% to 1.10%. However, with the introduction of the PSM, the interest rates stabilized and became more predictable. As time passed, the PSM was no longer viewed as a short-term debt instrument but rather as an onboarding facility and cash-equivalent. Consequently, USDC, a common currency used in the PSM, at one point, constituted as much as 85-86% of the collateral.

6-3 Other Stablecoins

When compared to USDC and DAI, Tether was being traded for more than its stated value of $1 (Figure 6). Tether is inversely correlated with US regulatory risk. However, given Tether's opacity surrounding USDT's reserves and their location, it is difficult to determine whether they were also exposed to the collapse of Silicon Valley Bank. While the market seemed to have rushed towards Tether during the incident, it may not have been rational to do so, as the lack of transparency regarding their reserves and exposure to risk raises significant concerns.

Figure 6 Tether (December 15th to March 15th)

6-4 Centralized Exchanges (CEX) and Decentralized Exchanges (DEX)

This section will delve into the growing volume and distinguish the key distinctions between centralized exchanges (CEX) and decentralized exchanges (DEX).

Coinbase and Binance suspended USDC conversions from March 10th to 12th due to the high inflow of USDC (Figure 7).

Figure 7 Announcement from Binance and Coinbase (March 10th)
(Source: Binance and Coinbase)

The trading options for USDC-USD pairs on CEX are restricted, and the liquidity is relatively low. According to data from Kaiko, the daily average trade volume during that period was approximately $20-$40 million. As shown in Figure 8, the trading volume of USDC and USD hit all time record of $600 million (Aubert et al., 2023).
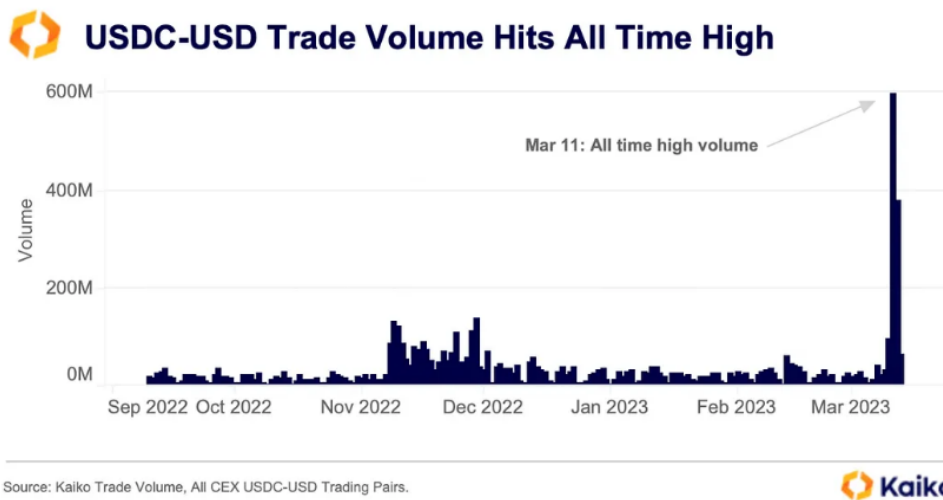
Figure 8 USDC-USD Trade Valume
(Source: Aubert et al. (2023))

Figure 9 shows the flows from CEX to personal wallets and Figure 10 shows the value sent from CEX to DEX. During this period, there was a significant migration of USDC to DEX. Many users likely chose to transfer their USDC holdings to self-custody to sell them in exchange for other cryptocurrencies via DEX, as trading of USDC was temporarily suspended on CEX. This shift in activity was driven by the desire to liquidate USDC holdings and explore alternative investment options while trading on CEX was halted (Chainalysis, 2023). As Figure 11 illustrates, the flow mainly consisted of USDC and wETH (Wrapped Ether).[9] Remarkably, it can be implied that the halt in the CEX caused panic and promoted the flow from CEX to DEX.
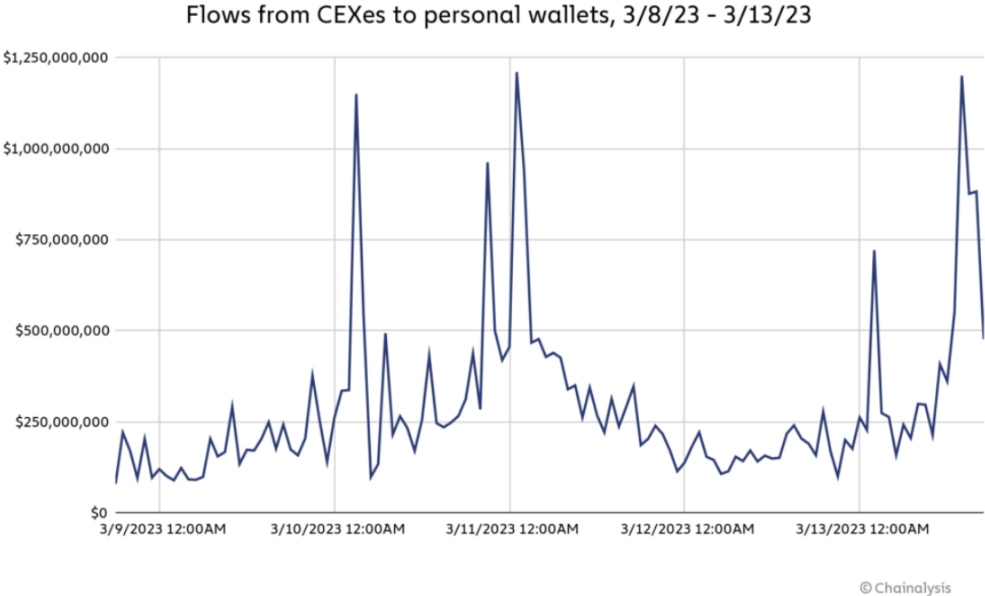
Figure 9 Flows from CEX to personal wallets
(Source: Chainalysis (2023))

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[9] Chainalysis (2023) assumes that Wrapped Ether (wETH) transfer to DEXes is likely to have reflected an influx of funds from traders looking to take advantage of the volatility in the market.
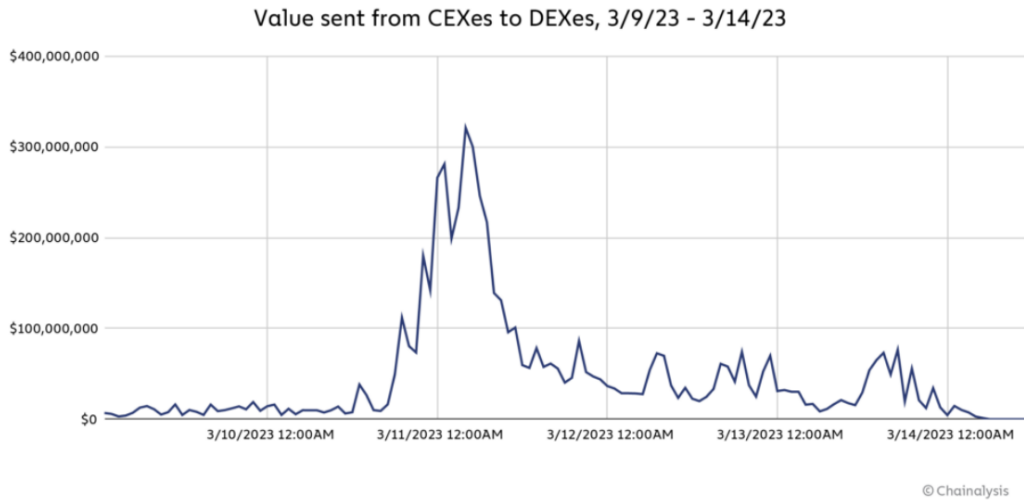
Figure 10 Value sent from CEX to DEX
(Source: Chainalysis (2023))
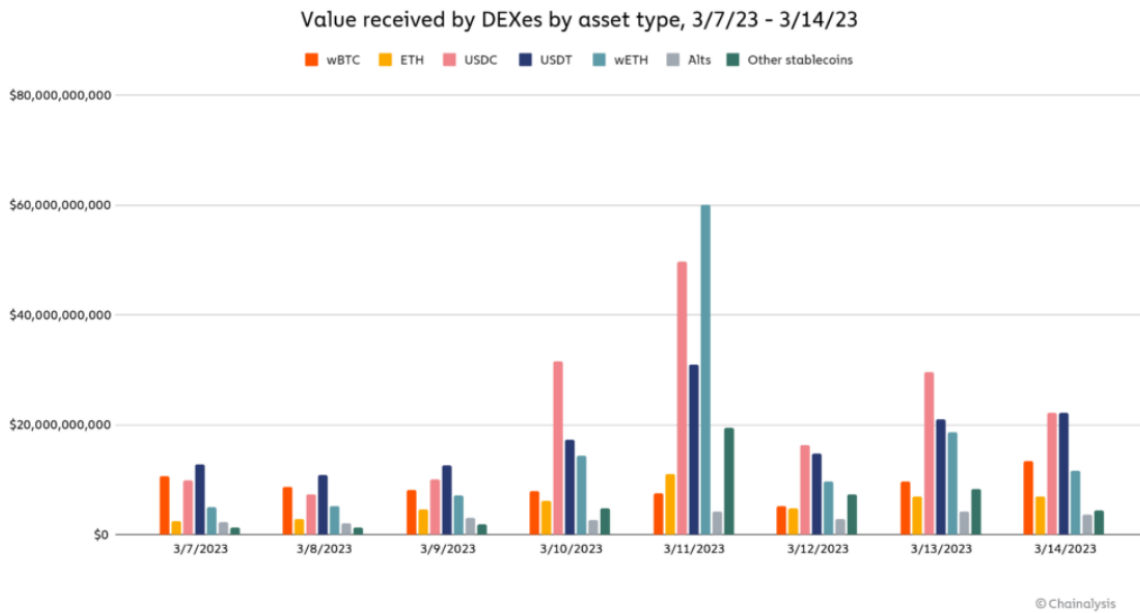
Figure 11 Value received by DEX by asset type
(Source: Chainalysis (2023))

Based on Figure 12 and Figure 13, it is evident that there was a significant surge in trading volume on DEXs, particularly on March 11th, reaching a total of $26 billion. Notably, Uniswap and Curve were the two DEX platforms that experienced the most substantial trading volume during this period, with Uniswap accounting for $12.6 billion and Curve accounting for

$8.0 billion of the total trading volume. These figures indicate a significant flow of trading activity and liquidity into these decentralized platforms on that specific day.
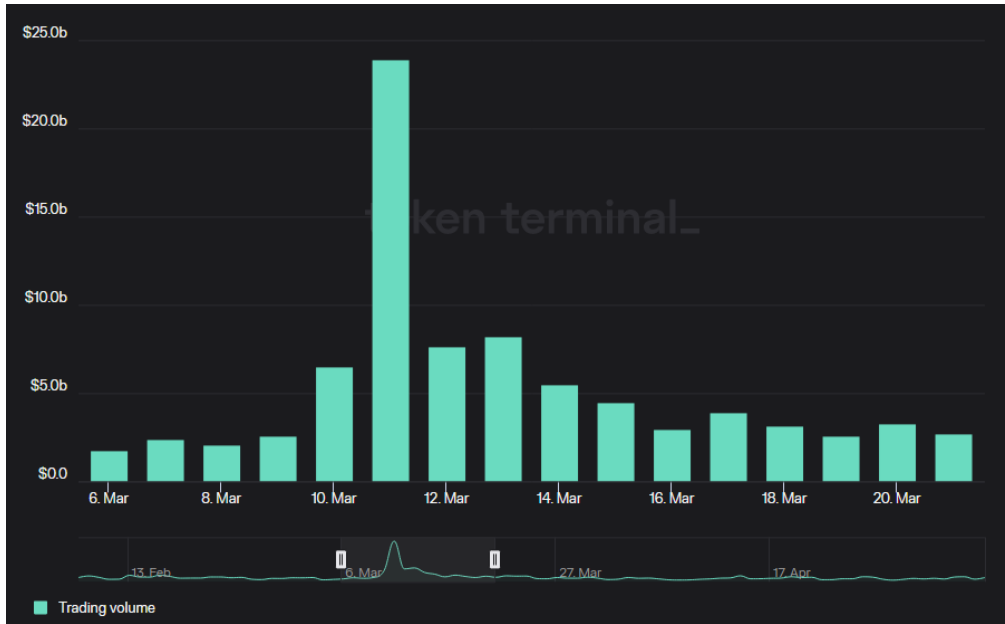
Figure 12 Daily aggregated trading volume for the top 20 projects in the DEX
(Source: Token Terminal)
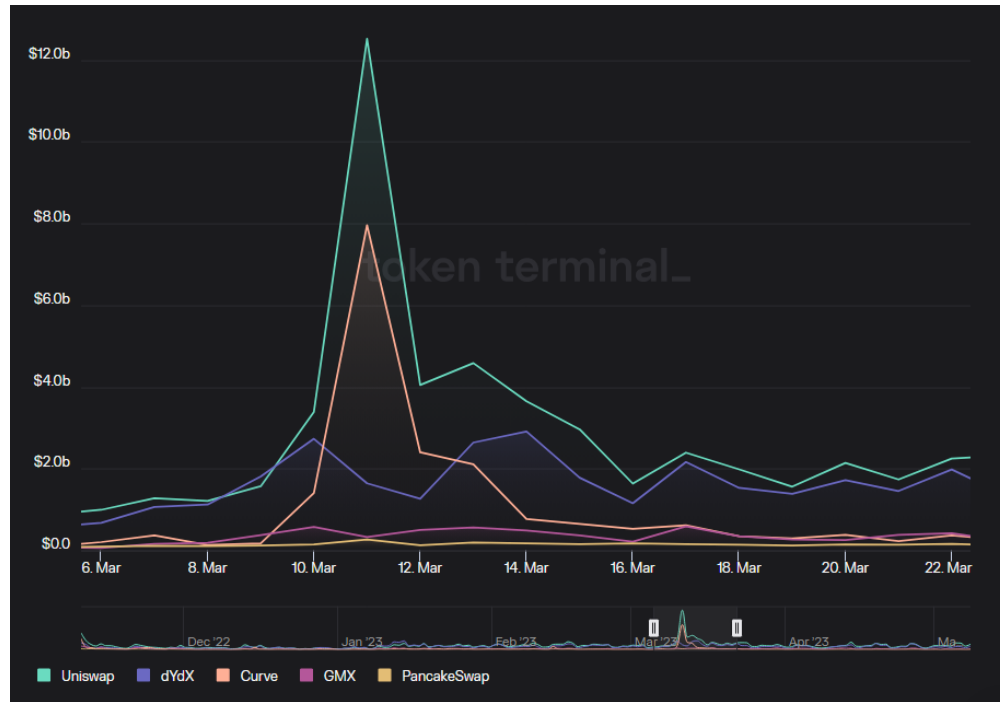
Figure 13 Daily trading volume for Uniswap, dYdX, Curve, GMX, PancakeSwap
(Source: Token Terminal)

The observation of increased acquisitions of USDT, DAI, and USDC on Curve and Uniswap during the weekend, coincided with the depegging of USDC (Chainalysis, 2023). Chainalysis (2023) assess that the spike in USDC acquisitions, despite its depegging, could indeed suggest that some traders anticipated USDC's ability to regain its peg in the future. These traders may have taken advantage of the discounted price of USDC during its depegged state, anticipating that it would eventually return to its intended value. At the same time, during the weekend, several derivatives emerged on offering leverage options ranging from 10x on BitMEX, 20x on OKEx, and up to 30x on Binance (Aubert et al., 2023).

The mechanism of how the market panicked during the USDC deppeging incident is an important consideration. The key factor was the decrease in the reserve rate resulting in the lack of access to the cash reserves while the bank was being evaluated by the FDIC. Even if the lack of reserves was a constant number, redeeming USD from USDC at a CEX such as Coinbase would decrease the reserve rate of USDC. This would result in a drop in the accounting value of USDC if redemptions were made at a 1:1 rate.[10] While the hole in the accounting resulting from Silicon Valley Bank's collapse was not large enough to make USDC worth $0.87, the logical expectation of continued redemptions at a 1:1 rate was a factor contributing to the market panic.[11] This highlights the importance of considering on- and off-ramps as a significant factor in stablecoin value stability.

It is also interesting to note that DEX was commonly utilized by spot "panic sellers" who felt the need to quickly dispose of their currency due to concerns about depegging. On the other hand, CEX that offer derivatives were predominantly used by individuals speculating on the USDC's ability to repeg.

6-5 Other Possible Impacts

Indeed, the impact of stablecoin volatility following the Silicon Valley Bank collapse may extend beyond the stablecoin ecosystem itself. As Ge Huang, Miao, and Ostroff (2023) note, the use of stablecoins extends beyond crypto trading to include their use as a means for companies to store capital and profits. Therefore, any disruption in the stability of stablecoins could have ripple effects throughout the broader financial system. While there have not been apparent cases as of the current moment, the possibility of such incidents occurring underscores the importance of comprehending the potential risks and implications associated with stablecoin volatility.

It is possible that if the stablecoin took a longer time to repeg, it could have had a significant impact on various aspects of the ecosystem. Digital markets could experience higher volatility and increased trading costs. Peer-to-peer and cross-border payments may be delayed or become more expensive, affecting businesses and individuals who rely on these transactions.

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[10] During the incident, Circle was still honoring 1:1 redemptions.
[11] There were comments that stablecoins should lower the redemption rate in case they lose part of their reserves.

Internal transfers and liquidity management could also be affected, as stablecoins are often used for these purposes. Further research on the transmission effect needs to be explored.

7. What is classic and what is new about the incident from the perspective of stablecoins and DeFi?

<Key Points>
- Acknowledging that there is classical/historical context in the problem.
- The perfect "safe money" mechanism is difficult to build. Our past bitter experience has led to the introduction of various safeguards as regulations (including self-regulation) to ensure financial stability and consumer protection. It is time to reflect on the initial purpose and implementation of these measures. We should avoid "reinventing the wheel."
- Asset-backed financial products and bank deposits are exposed to risks that are not novel. However, where was the risk, and were necessary and effective steps taken to mitigate these risks?
- Discuss whether these measures built on experience are applicable or how they are applied to stablecoins and DeFi.
- At the same time, we will identify new risks and vulnerabilities that were revealed after the depegging of USDC.

7-1 Value Stability of the Stablecoin

Roughly speaking, there are two types of structures to support the "value stability" of stablecoins: asset-linked and algorithm-based.[12] The asset-linked stablecoins includes both off-chain collateralized stablecoins (linked to bank deposits or other cash-like assets traded in the traditional financial system) and on-chain collateralized stablecoins (linked to assets represented by tokens on a blockchain) (Baughman et al., 2022).

In addition, the creditworthiness of the stablecoin issuer or governing body's asset is a crucial element, as they are responsible for establishing and enforcing the rules governing the stablecoin arrangement that aims to maintain its value.[13]

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[12] Algorithmic trading can contribute to stablecoin value stability by automatically buying or selling stablecoins on exchanges in response to price changes. This can help to maintain the stablecoin's peg to the underlying asset or currency by increasing or decreasing the supply of stablecoins in circulation as needed. One example of a stablecoin that uses algorithmic trading to maintain its peg is DAI, which is pegged to the value of the US dollar.

[13] In the traditional world there are all sorts of ratings. In the DeFi ecosystem where transparency is often limited, how to measure creditworthiness is a question that needs to be further explored.

1) **Backing**[14]**:**
   The issuance of coins is typically backed by safe assets that have a low risk of default or market value fluctuation. These assets are used as backing to issue the coins, and the backing can take various forms, such as creating a special purpose vehicle where the sole liability is the coin, while the sole assets are the safe assets, or using entrustment/backing schemes that are allowed by applicable laws and regulations. Safe assets usually comprise financial products that are short-dated, close-to-cash, or have government (sovereign) risk, such as bank deposits with high-credit rating banks and short-dated government bonds.

2) **Algorithmic trading:**
   Stablecoins are typically stabilized through the use of algorithms that automatically execute buy or sell transactions to maintain the value of the coin at the target value (e.g., USD). For instance, in the case of a USD-pegged stablecoin, when the value of the coin price falls below a certain threshold against USD, the issuer of the coin buys the coin in the market to increase the price of the coin. Another approach involves raising the premium, which can be considered as a quasi-interest rate, for holding the coin to encourage holders to purchase more coins. By increasing the premium, stablecoin issuers can incentivize holders to keep their funds in the coin, rather than withdrawing them and to potentially purchase more coins to earn even higher premiums. This can help to maintain the stability of the stablecoin by increasing demand for it and ensuring that its value remains closely pegged to the underlying asset or currency.[15]

3) **Credibility of the issuer's assets:**
   Stablecoin issuers may guarantee the exchange of the coin to legal tender or other types of assets upon request by the holders, either explicitly or implicitly. In such cases, the credibility and the quality of the issuer's assets becomes crucial. To ensure stability and reliability, stablecoin issuers must establish a reputation for trustworthiness and transparency as well as ability to access those assets. This is particularly important because stablecoins are often used as a store of value or medium of exchange, and users may be less likely to hold or transact with a stablecoin if they have doubts about its stability or credibility. The issuer's credibility also supports the trust of coin holders in the measures of backing and algorithmic trading.

   The collapse of Silicon Valley Bank directly affected the backing and raised concerns about the stablecoin issuer's ability to access the deposits.

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[14] "Backing" incorporates two meanings: 1) the coin holders have the right to redeem the coins for the backing reserve assets, 2) an operating entity can use the backing reserves to buy the coins at its own discretion (and not at the coin holder's discretion). It needs to be distinguished from "collateral" which means something pledged as security for repayment of a loan, to be forfeited in the event of a default.
[15] An unsustainable 20% premium was also a significant factor in Terra's collapse.

Upon information and belief, the announcement by Circle, the governance body of USDC, of a cash deposit with Silicon Valley Bank triggered fears of declining reserve value and/or liquidity of Circle. Silicon Valley Bank's collapse was partially caused by panicky withdrawals of deposits, and the sell-off of USDC can also be characterized as a panic among holders. This incident underscores the importance of the quality of the issuer's assets and the need for trust and transparency in stablecoin issuers.[16] However, it is important to acknowledge that even with transparency and audit mechanisms in place there may be value instability. In fact, in part the issuer's transparency here played a role in the temporary decline of USDC's secondary market trading price. By announcing on March 10 that $3.3 billion in cash reserves were held at Silicon Valley Bank, the issuer Circle displayed transparency. In contrast, stablecoin issuers who are less transparent with their reserves may not experience the same market response, potentially highlighting concerns about their credibility.

7-2 Stabilizing Currency Value is a Classic Problem

The earlier provides a framework for understanding stablecoin value, which can be supported by 1) backing, 2) algorithmic trading, and 3) the credibility of the issuer. According to Baughman et al. (2022), stablecoin issuers can be likened to currency boards. Similar to a currency board, stablecoin issuers are mandated to uphold a fixed exchange rate with a foreign currency and maintain reserves consisting of that foreign currency. By examining existing financial models that have been used to stabilize the value of certain currencies in history, it is possible to gain insights into the potential risks and benefits of stablecoins.

It is essential to acknowledge that having a reserve and a good credibility mean nothing if, at the time of market pressures, the issuer doesn't use them to perform or encourage buy/sell stabilization operations, directly or indirectly.

1) **Backing:**
   The backing structure of a currency has traditionally been a crucial factor in maintaining its stability, as seen in the case of the Hong Kong Dollar (HKD). While gold-backed currencies were prevalent in the past, most countries have since abandoned the gold standard in favor of greater monetary control.

   The USD deposit is held at the Hong Kong Monetary Authority (HKMA), which is a government agency that acts as the central bank of Hong Kong. This means that the HKD is backed by a relatively safe and stable asset, the USD. The HKMA is also responsible for maintaining the exchange rate of the HKD against the USD within a narrow band, which means it needs to intervene in the foreign exchange market by buying HKD and selling USD to maintain the peg. Nonetheless, even with such backing,

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[16] There were comments in the discussion that cash deposits are rehypothecated by financial institutions, and safer cash could be held at the Federal Reserve.

the HKD is still susceptible to speculative attacks by traders who seek to break the target exchange rate.

In order to maintain the stability of the HKD's peg, the HKMA engages in foreign exchange market interventions by purchasing HKD and selling USD. This has been a successful strategy, but it does come with a cost. These interventions require the use of substantial foreign reserves, which can limit their availability for other uses.

The example of HKD highlights the difficulty of maintaining stability even with a strong backing structure and very little credit risk or maturity risk. It also demonstrates the importance of active intervention by the authority to defend the peg and the potential cost associated with such intervention.

In the case of stablecoins, the backing assets used are not as strictly risk-free as in the case of HKD. These assets are exposed to credit risk from the banks receiving the deposits, interest rate risks for medium/long-dated government bonds, and liquidity risk for many assets. Thus, we need to address the issue of the "backing scheme" in two ways: first, by addressing the risk of fluctuations in the reserve value, and second, by addressing the challenge of establishing and maintaining holders' trust in the reserve value, which can be more difficult to tackle.

Different types of reserve can have different implications for stablecoin value stability.[17]

- Fiat currency: Using a fiat currency as backing, such as the USD or the Euro, can provide a high level of stability and liquidity to a stablecoin. However, it is subject to the credit risk of the bank holding the fiat currency, as well as the potential risk of inflation and other economic factors that can affect the value of the backing.

- Cryptocurrency: Using a cryptocurrency as backing can indeed bring transparency and decentralization to a stablecoin, eliminating the need for reliance on a centralized institution. However, it is important to note that cryptocurrencies can be highly volatile, and their value can experience rapid fluctuations and therefore the stablecoin will likely not remain consistent.

- Precious metals: Using precious metals like gold or silver as backing for stablecoins can offer stability due to their historical value and relative stability. However, these metals can be challenging to store and transport physically, and their value can still be subject to fluctuations in the market. Additionally, one can also face challenges in terms of verifying the authenticity of the metal and ensuring its security.

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[17] How the backing of a stable instrument by a volatile instrument will inevitably lead to greater potential for fluctuation of the "stable" token needs to be discussed further.

- Real estate: Using real estate as backing can provide stability, as the value of the real estate as the value of property generally appreciates over time. However, real estate may not be easily liquidated, and its value can be influenced by local economic conditions.

- Other financial assets: Using other financial assets, such as bonds or stocks, as backing can provide diversification and potentially higher returns for a stablecoin. However, these assets are subject to credit and market risks, and their value can fluctuate based on economic conditions and other factors beyond their control.

2) **Stabilization mechanism:**
Many central banks and ministries of finance have attempted to stabilize the exchange rates of their home currencies by intervening in the foreign exchange (FX) market. Some of these efforts have not been effective in traditional settings for instance the Swiss Franc peg, which was abandoned after serious attempts by the Swiss National Bank's market intervention operations. Ultimately, the Swiss National Bank gave up selling Swiss Francs as it could not devalue the currency. As a result, the Swiss National Bank was forced to buy a massive amount of foreign currencies, which are now invested in foreign assets that still remain on the balance sheet.

It is challenging for central banks, even with good liquidity and public support, to maintain currency stability solely through buy-sell operations or crude algorithmic trading. They face several obstacles when attempting to stabilize currency values through market interventions. One of the main challenges is the limited impact of these interventions, especially when faced with significant market pressures. These interventions can be expensive and may not always produce the desired outcome. Furthermore, central banks must deal with the unpredictability of market sentiment, which can change quickly and undermine their efforts to stabilize currency values. Additionally, interventions can have unintended consequences, such as inflation or capital flight. Finally, there is a concern that repeated interventions may erode confidence in the central bank's ability to maintain stability, exacerbating volatility and reducing the effectiveness of interventions.

3) **Credibility of the issuer (issuer's assets)**
The credibility of the issuer's asset is a critical factor in maintaining the stability of a stablecoin and shares many similarities with the importance of collateral. The value of assets held by the issuer is essential for maintaining the trust of the coin holders. If the issuer's credibility is in doubt, holders may sell or liquidate their coins, causing the coin's price to decline and the peg to break. This vulnerability to bank-run-type risks highlights

the importance of maintaining the issuer's credibility through transparency and accountability measures.

7-3 Asset-backed is exposed to risk

When comparing pegged legal tender, such as the USD-pegged HKD, with USDC-like stablecoins, it is important to note that the HKD is backed by two mechanisms with sovereign counterparty risk: the value of USD deposits with the Hong Kong government and the intervention by the HKMA, which is part of the Hong Kong government.[18] However, even with these two mechanisms, HKD is not immune to value fluctuation.

In the case of the HKD, the issuer, a private-sector bank, does not make money and may actually lose money, as they do not earn interest from the backing asset, which is the sovereign risk USD deposit. On the other hand, stablecoins like USDC are backed by a combination of cash and cash equivalents; other stablecoins like USDT are also backed with other assets such as government securities or corporate bonds. Some of the assets in USDT's reserve are subject to higher credit risk, interest rate risk, and liquidity risk, which can affect the value of the stablecoin. Moreover, the issuer of USDC and other stablecoins may not have the same level of credibility as a government-backed institution like the HKMA, which could undermine the trust of users in the stablecoin.

The differences in backing mechanisms between the HKD and stablecoins present challenges in maintaining value stability and earning yields. While the HKD's backing mechanism provides a high degree of stability, it does not generate a yield. In contrast, stablecoins can potentially earn yields by investing their reserves in higher-yielding assets, but this carries the risk of losses if these assets experience price fluctuations or default.[19] Additionally, stablecoins may struggle to maintain their value stability in the long term due to the associated risks of their backing assets and the credibility of their issuers.

As a result, generating profits through the "safe money" model (i.e. mitigating the risk of default, and ensuring that your wealth retains its nominal value over time) can be difficult.

7-4 Concentration of Economic Power and Anti-Competitive Effects

The concentration of economic power and anti-competitive effects, which are identified as policy concerns by the President's Working Group on Financial Markets (PWG), the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency (OCC), are similarly observed in traditional finance. This reaction primarily pertained to Libra/Diem and was not directly observed in the incidents that followed Silicon Valley Bank's collapse. However,

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[18] HKMA intervention purchases of HKD use the USD deposits and therefore, it is one mechanism enabled by the HKMA's USD reserve.

[19] A user of a stablecoin is not earning yield from the stablecoin itself which is a clear differentiator between stablecoins and Money Marlet Funds (MMFs).

it is important to acknowledge this risk as it remains a significant concern. These risks are stated as follows.

Box 2: Risk of Concentration of Economic Power and Anti-Competitive Effects

"… the combination of a stablecoin issuer or wallet provider and a commercial firm could lead to an excessive concentration of economic power. These policy concerns are analogous to those traditionally associated with the mixing of banking and commerce, such as advantages in accessing credit or using data to market or restrict access to products. This combination could have detrimental effects on competition and lead to market concentration in sectors of the real economy."

"… a stablecoin that becomes widely adopted as a means of payment could present concerns about anti-competitive effects, for example, if users of that stablecoin face undue frictions or costs in the event they choose to switch to other payment products or services. Concerns about anti-competitive effects are thus likely to be greater absent interoperability standards for stablecoins and stablecoin arrangements."

(Source: President's Working Group on Financial Markets et al. (2021))

7-5 What did the depegging cause or reveal?

Stablecoins have been gaining popularity in the financial industry due to their potential to offer a reliable and flexible payment system. However, there are concerns about their role in the broader financial system and the potential risks they pose. Simple disclosure is not enough, and there is a need to examine the stability and risks associated with stablecoins.

One of the major concerns with stablecoins is the potential for systemic risk in the event of significant market volatility or liquidity shock. The relationship between stablecoins and traditional financial institutions also raises potential risks and benefits, including the risk of market disruption and the potential for increased financial inclusion.

Market volatility is another potential risk associated with stablecoins, particularly those backed by cryptocurrencies. These stablecoins can be subject to significant price fluctuations, which could impact their stability and usability as a payment system.

Reputation risk is another challenge for stablecoins, particularly those less transparent about their backing assets or issuer credibility. This can lead to a lack of trust among users, which could impact their adoption and usage.

Liquidity risk and counterparty risk are also concerns associated with stablecoins, particularly in the event of issuer insolvency or a bank run on the backing assets. Regulatory risk is also a consideration, particularly as regulators seek to address the potential risks associated with stablecoins and their impact on the broader financial system.

There is also a potential risk associated with interest rate fluctuations for stablecoins backed by financial assets. When interest rates decrease, stablecoin issuers may lose their primary source of profit. Although short-term government bonds are typically less affected by rising interest rates due to their shorter durations, they were not immune to falling prices when short-term interest rates experienced a significant increase in 2022. Consequently, if redemption requests coincide with these risk events, stablecoin operators could face the possibility of default.

Despite these risks, countries that use stablecoins as a means of domestic and international payment can experience positive effects on the real economy, including increased financial inclusion and reduced transaction costs. At the same time, it is important to carefully consider the potential risks and benefits associated with their usage.

Potential solutions or preventative measures for future instability events in the DeFi ecosystem include increased transparency and disclosure around backing assets, enhanced regulatory oversight, and alternative stability mechanisms such as access to central bank reserves which is explained in Section 9. Overall, it is essential to carefully manage the impact of stablecoins on the broader financial system and take appropriate steps to address potential risks.

8. Potential Points of Failure for Stablecoins

<Key Points>
- We will list the Trust Point (centralized elements that users and others are forced to trust unconditionally)/Chain of Trust (a chain of dependencies that includes a trust point) and its related risks/problems that were revealed in the incident.
- Some of the critical questions we hope to discover are as follows;
    - Where and what is the Trust Point/Chain of Trust in stablecoins and DeFi?
    - Why did the holders/users of stablecoins and DeFi products have to bear the counterparty risk?
    - What was lacking in consumer protection?
    - Were classical risks (market volatility risk, credit risk, maturity mismatch risk, liquidity risk, counterparty risk, reputation risk, etc.) perceived fully by the stakeholders, and were measures to prevent that implemented by the stakeholders?
    - What was the interconnectedness that caused the spillover/domino effect? Is there any route that would have stopped these effects?
    - Does it have the possibility to cause a potential systemic risk?
- We will analyze using the framework proposed by the Financial Stability Boards' "Assessment of Risks to Financial Stability from Crypto-assets" (FSB (2022)).

8-1 Why did the users bear the credit risk?

The recent incident with USDC highlights the credit risk faced by its users. There is transparency on the Treasury side of Circle's balance sheet and the cash side is attested through a third party, in this case by Deloitte. In the event of the stablecoin issuer's bankruptcy, there is a question of deciding the priority of repayment, bonds issued by the stablecoin issuer if any, or the stablecoins. A similar question is always raised when dealing with bank insolvencies. There was a comment that there should be clarification on the priority in the case of insolvencies as the credit risk borne by the user is significantly dependent on it. This suggests the need for real-time and ongoing monitoring of their balance sheet as a regulatory requirement.[20]

Additionally, the tier level of their custodians should be considered. Are they top-tier banks or lower-tier regional banks? Even with a Moody's rating, as in the case of Sllicon Valley Bank, it may not be sufficient, as seen during the global financial crisis.[21] Thus, it is crucial to assess the credit risk associated with stablecoins and ensure appropriate measures are in place to manage this risk.

Tether Inc., which also issues a stablecoin USDT, acknowledges potential issues regarding the security of its dollar deposits in its white paper. These concerns are outlined as follows (Figure 14).

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1. We (Tether Inc.) could go bankrupt
2. Our bank could go insolvent
3. Our bank could freeze or confiscate the funds
4. We could abscond with the reserve assets
5. Recentralization of risk to a single point of failure

Figure 14 Implementation Weaknesses
(Source: Tether Inc. (2016))

In the case of USDC, the potential problem of bank insolvency and the single point of failure on the redemption of tokens materialized leading to deppeging.

Tether Inc. acknowledges the potential risk of bank insolvency in the white paper and outlines their approach to address this concern by establishing additional banking partners in other jurisdictions to further mitigate the risk (Tether Inc., 2016).

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[20] In the event of a Circle bankruptcy, segregated USDC reserves should remain redeemable at face value, shielded from Circle creditors, and separated from a bankruptcy estate per the protections afforded under state money transmission laws and applicable federal bankruptcy laws.

[21] There were comments that the mechanism of how the market panicked logically must be considered. One commenter stated that the key factor was the decrease of the reserve rate by the redemption/claim from the USDC holders for USD on the bank. Even if the lack of reserve were a constant number, redeeming USD from USDC at the CEX, like Coinbase, would decrease the reserve rate of USDC. That meant the accounting value of USDC would drop if the redemption were 1:1. There was no way to avoid stopping redemption at CEXs. The hole of the accounting, which Silicon Valley Bank collapse made, was not big enough to make USDC $0.91. The logical expectation of the redemption to continue at 1:1 was the main factor of the market panic.

To mitigate the risk of re-centralization, Tether Inc. has stated that they reduced the centralization risk to a singular responsibility - the creation and redemption of tokens. They have decentralized all other aspects of the system to prevent a single point of failure (Tether Inc., 2016).

Lyons and Viswanath-Natra (2023) present the backing systems used by the six largest stablecoins based on market capitalization. Although all stablecoins are asset-backed, they use different mechanisms to maintain stability. However, despite the differences in the backing systems, all stablecoins are vulnerable to the risks of bank insolvency and the re-centralization of risk to a single point of failure, which could lead to the deppeging of stablecoins, such as in the case of USDC.

Indeed, finding banking partners that are willing to work with stablecoin issuers can be challenging, especially given the lack of regulatory clarity in this area. Banks may be hesitant to onboard stablecoin issuers due to concerns about regulatory scrutiny, reputational risk, and the potential for money laundering or other illegal activities.

Moreover, stablecoin issuers may face difficulty finding banking partners that provide 24/7 settlement. Banks typically have set hours of operation and may not be equipped to handle the constant settlement required for stablecoin transactions.

In addition, even if stablecoin issuers are able to diversify their banking partners, they may still face the risk of re-centralization if the majority of their reserves are held by a single banking partner. This highlights the importance of considering alternative stability mechanisms to mitigate the risk of a single point of failure.

8-2 Interconnectedness and Spillover Effects

The interconnectedness of stablecoins refers to the complex relationships and dependencies that exist between stablecoins and other components of the DeFi ecosystem. As discussed in Section 6, the interconnected nature of the DeFi ecosystem can lead to contagion effects. Łęt et al. (2023) found that shocks in the volatile cryptocurrency market can increase the popularity of stablecoins, although any spillover effects on stablecoin popularity are typically short-lived. Investors tend to use stablecoins as safe haven assets during times of market uncertainty. However, in the case under consideration, there was a spillover effect from the stablecoin to the DeFi ecosystem.

Figure 15 illustrates the interconnectedness within the DeFi ecosystem, highlighting the frequent use of stablecoins as a bridge between traditional fiat currencies and various digital assets, as well as their role as collateral in crypto-asset derivative transactions and DeFi trading, lending, and borrowing. Any sudden drop in the value of the fiat currency pegged to a stablecoin or failure of the bank providing backing could trigger a significant decline in the stablecoin's value and potentially cause a ripple effect on other cryptocurrencies, as shown in the diagram. The later section of this paper discusses the potential impact on the broader financial system.
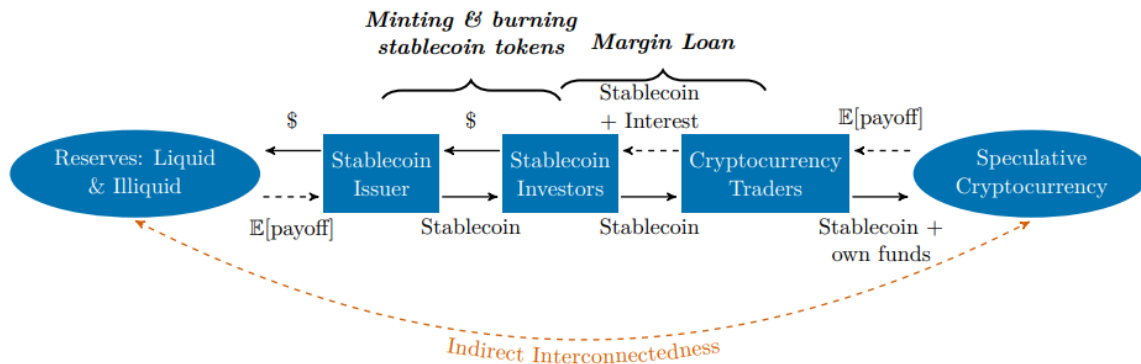
Figure 15 Interconnectedness of stablecoin
(Source: Gorton et al. (2022))

There is no guaranteed way to completely prevent the domino effect of instability from stablecoins. However, diversifying each interaction can help reduce the likelihood of transmission of insolvency or credit risk. This includes diversifying interactions between the reserve-stablecoin issuer, stablecoin issuer-stablecoin investors, stablecoin investors-crypto currency traders, and cryptocurrency traders-speculative cryptocurrency.

It is important to consider potential loopholes in redemption prevention mechanisms similar to those found in Money Market Funds (MMFs) and Open-End Funds (OEFs). Funds offering pass-through-risk products like U.S. institutional prime MMFs and OEFs are vulnerable to run risk due to the strategic complementarities of exiting the market first, facilitated by (near)-same-day redemption. This first-mover advantage creates an environment where stressed markets can amplify the potential for runs on these funds (Pascual et al., 2021).

These loopholes could allow investors to redeem their stablecoins in a way that undermines the stability and liquidity of the stablecoin issuer, potentially leading to a contagion effect throughout the cryptocurrency ecosystem. Therefore, it is crucial for stablecoin issuers to implement robust redemption prevention mechanisms and continuously monitor and adjust them to ensure their effectiveness. This can help reduce the likelihood of instability and contagion risk in the DeFi market.

Furthermore, asset segregation for stablecoins can help to reduce the risk of contagion effects. This practice involves keeping the assets that back a stablecoin completely separate from the issuer's own assets. By doing so, it can increase transparency and build trust and confidence in the stablecoin. This, in turn, can make it less vulnerable to runs or loss of confidence. However, asset segregation requires clear rules and procedures for implementation, as well as effective enforcement by the regulatory body. Without proper implementation and enforcement, asset segregation may not effectively reduce the risk of contagion effects.

8-3 Governance Body

As discussed in Section 6, the response by the governance body of a stablecoin is critical in the event of a depegging. Specifically, let us reflect on the response from MakerDAO and the observations made.

- **How slow MakerDAO was to act**
  The response from MakerDAO to the stablecoin depegging was slow, as observed in Section 6. This is due to the fact that smart contract updates are handled by a relatively small team, which had remained the same since the foundational days. Meanwhile, regional core developers have recently left the team to retire or create other protocols, resulting in a bottleneck in the release process. Furthermore, the incident occurred in the middle of the weekend, and the team is distributed across geographical locations, further complicating the response. It is noteworthy that there are no formal Business Continuity Plan (BCP) or crisis response plans in place for MakerDAO as a whole, although select sub-teams, such as the Real World Assets team, have developed their own plans.

- **PSMs falling out of vogue?**
  Anecdotal evidence from conversations with industry experts suggest that the use of PSMs may be declining in popularity, as teams shift towards vaults for crypto-native assets such as Ether. However, it may be premature to fully embrace this shift, as highly liquid tokenized Real World Assets (RWAs) are still in the early stages of development, and are expected to compete with crypto-native collateral as acceptable security. PSMs provide a solution to the liquidity problem by utilizing cash or cash-equivalents as a tier 1 asset. However, the USDC depeg event and contagion to DeFi stablecoins revealed that PSM contracts have the characteristic of acting similarly to a credit default swap in the time of a crisis, causing the stablecoin to fall to the value of its lowest-quality PSM collateral, as happened in the case of DAI and other similar stablecoins.

During times of emergency or crisis, the decision-making process is typically centralized and controlled by a central authority or entity. To prevent panic selling or rapid market downturns, a circuit breaker mechanism should be implemented. This mechanism aims to maintain stability and prevent fire sales that can lead to market instability.

Indeed, it is not necessary to implement an abrupt on/off mechanism to address runs on stablecoins. A gradual approach can be effective, and liquidity pools are well-suited for such mechanisms.

One alternative approach to mitigating runs is to establish a system where redemption of stablecoins is limited to a specific amount, such as x dollars per stablecoin, provided that the reserve ratio is x and x is less than 1.

It is important to acknowledge that in emergency situations, the behavior and panic exhibited by individuals are similar, regardless of whether it is in the context of traditional finance or decentralized finance. Therefore, it is valuable to learn from the approaches employed by traditional finance in handling such emergent situations.

In addition, the 24/7 nature of stablecoin transactions introduces new challenges compared to traditional finance. Unlike in traditional finance, where there may be a few days to react and respond to market events, the continuous nature of stablecoin transactions requires swift and timely responses. Therefore, it is necessary to consider how to effectively respond to emergency situations and maintain stability in a decentralized financial system, taking into account the lessons learned from traditional finance while also adapting to the unique characteristics of stablecoin transactions.

8-4 Risks to Financial Stability

Born and Vendrell Simón (2022) have highlighted that the rapid growth of new crypto assets has led to an increasingly complex and interconnected ecosystem. They have expressed concern about the contagion effects on the financial system through a run on stablecoin (Figure 16).

"The critical function that some stablecoins serve in the wider crypto-asset ecosystem and for unbacked crypto-assets could have contagion effects for the financial system if at some point in the future, unbacked crypto-assets pose a risk to financial stability. Given that the largest stablecoins serve a critical function for crypto-asset markets' liquidity, this could have wide-ranging implications for crypto-asset markets if there is a run-on or failure of one of the largest stablecoins. In turn, this could have contagion effects for the financial system if at some point in the future crypto-asset markets pose a risk to financial stability. A run on a stablecoin could also have contagion effects for the financial system through large-scale redemptions of reserve assets, which usually comprise traditional assets such as government bonds or commercial paper."

Figure 16 Implementation Weaknesses
(Source: Born and Vendrell Simón (2022))

Stablecoins have the potential to create risks for financial stability through various contagion channels. These channels include (1) financial sector exposures; (2) wealth effects, meaning the impact of changes in the value of crypto-assets on their investors, which can have knock-on effects on the financial system; (3) confidence effects, which refer to the potential impact of developments related to crypto-assets on investor confidence in crypto-asset markets and potentially the broader financial system; and (4) the extent to which crypto-assets are used for payments and settlements (FSB, 2022).

When losses occur in crypto-assets with the presence of leverage, liquidity mismatch, and connections with the traditional financial system, it can escalate systemic risk that emerges from wealth effects. Moreover, a loss of trust in stablecoins may trigger the liquidation of their reserve assets, which can disrupt the operations of short-term funding markets (Financial Stability Board, 2022).

9. Implications and Recommendations

<Key Points>
- Rethink and acknowledge existing past instruments and experience. At the same time, does technology provide a different way to avoid risk transmitted to users and economies? If so, in what way?
- Provide recommendations to avoid such problems in the future

Fundamentally, the question is whether stablecoins and DeFi are replicating the same problems and risks that Satoshi Nakamoto tried to address. Nakamoto (2008) aimed to address bank failures and bailouts by establishing an autonomous and immutable system through Bitcoin. While certain stablecoins and DeFi projects rely on human governance, it is important to note that this deviation does not apply to the entire ecosystem. It is possible to create fully autonomous, immutable, zero-governance stablecoins and DeFi protocols that are aligned to Satoshi Nakamoto's original vision.

The value stability of stablecoins in particular is at risk due to its exposure to credit risk and maturity mismatch risk in the underlying assets, which are common risks in the traditional finance industry.[22] While backing a stablecoin with 100% U.S. Treasuries can minimise credit and maturity risks, liquidity risk still exists due to the settlement cycle of securities. Conversely, backing a stablecoin with a commercial bank deposit exposes it to the risk of a classic bank run. An interesting solution is to back stablecoins with 100% central bank reserves, which would eliminate credit and liquidity risks, but this poses the challenge of how the issuer can earn yield within the narrow banking model (i.e. a financial system where banks are restricted to holding only safe and liquid assets, such as government bonds, to minimize risk and enhance financial stability).[23] Overall, the choice of backing for stablecoins requires careful consideration of various risks and trade-offs.

Using central bank reserves to back stablecoins has the potential to mitigate some of the risks associated with other forms of backing, such as credit and liquidity risks.[24] Central bank

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[22] This statement is not for certain stablecoins but for general stablecoins backed by assets. Treasury Bills less than 90 days are one of the most liquid asset class that exists and is backing USDC which reduces the liquidity risk.
[23] There was a comment in the discussion that 100% or partial central bank reserves, which would have the diversification aims could be considered.
[24] The majority of Circle's stablecoin reserves are already invested in an MMF called the Circle Reserve Fund, which is a single-beneficiary fund managed by BlackRock. This fund applied to use Federal Reserve reverse repos (RRPs)

reserves are widely regarded as very safe and low-risk assets, which could enhance the credibility of stablecoins and promote confidence in their value stability. Simultaneously, it is important to recognize that this approach entails implementing essential measures aimed at safeguarding the system. Strong regulations concerning risks such as consumer protection, stability, and compliance will be beneficial in this regard. This implies that for stablecoins to be a viable choice, they must adhere to rigorous regulatory standards and oversight, similar to traditional institutions like banks that rely on central bank reserves.

Another question that arises is the potential relationship between a stablecoin backed by central bank reserves and a respective Central Bank Digital Currency (CBDC). A CBDC is a digital version of a country's fiat currency that is issued and backed by the central bank, unlike stablecoins that are issued by private companies. CBDCs are typically backed by the full faith and credit of the government, which can increase their credibility and trustworthiness. If a stablecoin were backed by 100% central bank reserves, it could be viewed as a complement to a CBDC. The stablecoin would be issued by a private company and could be used in the market, while the CBDC would be issued by the central bank and used for official transactions. In this way, the stablecoin could serve as a bridge between the traditional financial system and the emerging CBDC ecosystem.

DeFi industry actors will also benefit from best practices in business continuity planning to be prepared for events that can endanger business operations regardless of what the cause might be, internal or external. New approaches have to be developed for decentralized organizations where control is distributed or decentralized. Learning from historical examples and traditional finance models, such as the use of reserve requirements and other regulatory frameworks, can also provide valuable insights for improving stablecoin stability. Further research into risks related to digital assets can also create new insights.

To address the limitations of backing, stabilization trading, and issuer credibility in maintaining stablecoin value stability, there are several recommendations that the stablecoin and broader financial industry can consider. One important aspect to consider when discussing stablecoins and their interaction with traditional finance (TradFi) is the fragility risk that arises at the point of minting. It is crucial not to underestimate the risks associated with TradFi when dealing with stablecoins. Given what the recent incident has uncovered, this paper recommends the following.

Recommendation 1 - Awareness about the risk:
It is important for stablecoin issuers to be fully aware of the risks involved in engaging with traditional finance. This includes understanding the regulatory and compliance requirements, as well as the potential challenges that may arise from interacting with banks and other financial

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in November 2022 but was denied in April 2023. It can be understood that this was the only way for a non-bank entity to deposit money with the Federal Reserve.
https://www.ledgerinsights.com/usdc-stablecoin-backdoor-cbdc-blackrock-help/
https://www.newyorkfed.org/markets/opolicy/operating_policy_230425

institutions. Implementing more transparent governance structures and regular third-party audits can help increase trust and confidence in stablecoin issuers as well as promoting awareness of the potential risks. Simultaneously, to ensure the effectiveness of third-party audits, it is crucial to carefully and comprehensively establish the parameters of the audit.

Recommendation 2 - Diversification of sources, banking partners and risks:
To manage the risks effectively, stablecoin issuers should diversify their sources, banking partners, and risk exposures. Relying on a single banking partner may increase vulnerability, so establishing relationships with multiple institutions can help mitigate this risk. Another solution is to diversify the backing beyond a single asset class or entity and include a mix of highly liquid and low-risk assets such as cash, government securities, and highly rated corporate bonds. It is also important to ensure that each asset has a low credit correlation. The optimized diversified portfolio depends on the nature of each asset. A credit crisis in any of several diversified assets could cause a panic credit crisis for the entire stablecoin. Therefore sometimes, increasing diversification unnecessarily may increase the likelihood of credit instability. For example, concentrating all collaterals in the repo market may result in lower risk. In fact, Tether is considering it instead of using multiple banks.[25] Additionally, incorporating more sophisticated risk management strategies, such as dynamic collateralization, can help mitigate the risk of reserve value fluctuations. For algorithmic trading, implementing more robust risk management tools and incorporating external market data can help reduce the risk of sudden market movements.

Recommendation 3 - Banking partners to facilitate stablecoin issuers:
Stablecoin issuers and regulators could motivate financial institutions to support stablecoin operations. This can be achieved by clear regulation and guidance from the regulators, establishing strong risk management practices, and providing transparency and accountability in issuer operations. Conversely, by encouraging banking partners to develop cooperative relationships and embrace the DeFi industry in accordance with regulatory guidance, it is possible to mitigate risks while fostering innovation. By cultivating a cooperative relationship with banks, stablecoin issuers can help facilitate smoother operations and gain the necessary support from the traditional financial system.

Recommendation 4 - Response Mechanism:
Given the interconnected nature of the ecosystem, it is crucial to acknowledge the contagion effect discussed in Section 6. As a result, every stakeholder within the chain must be prepared to respond to emergent incidents, either individually or collectively. This is particularly vital in the

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[25]

https://tether.to/en/tethers-latest-q1-2023-assurance-report-shows-reserves-surplus-at-all-time-high-of-244b-up-148b-in-net-profit-new-categories-for-additional-transparency-reveals-bitcoin-and-gold-allocations/

context of 24/7 settlement, where the ability to establish robust and rapid mechanisms within and between stakeholders becomes paramount in addressing fast-paced incidents.

To begin, it is essential to define the roles and responsibilities of each stakeholder and identify individual or collective responses/actions. This will lay the foundation for effective incident response. Furthermore, fostering collaboration among different stakeholders is a crucial initial step towards building a unified approach.

Drawing upon the best incident response practices and Business Continuity Plans (BCPs) from other industries can serve as a valuable resource. Leveraging the knowledge and experiences of industries that have successfully dealt with similar challenges can provide insights and strategies for enhancing incident response capabilities.

Additionally, organizing a stability forum can be explored as a means to facilitate constructive debates and discussions among stakeholders regarding incident response practices. Such a forum provides a platform for knowledge-sharing, exchanging insights, and collectively addressing the challenges faced within the ecosystem.

A general recommendation is to foster and enhance multi-stakeholder discussions involving all relevant parties. The digital assets industry has grown significantly and has the potential to impact the traditional financial system, while also being influenced by it. By objectively analyzing this emerging phenomenon, all stakeholders can derive benefits and gain a deeper understanding of the implications involved.[26] [27]

10. The role of BGIN

<Key Points>
- BGIN's mission, role, and approach to responding to the instability event discussed in the paper, and its ongoing efforts to promote stability and innovation in the DeFi ecosystem
- Ultimately, humanity dictates how technology is used. There is a necessity for open discussion. It is also necessary to learn from different stakeholders and past experiences.
- Exploration of potential future developments and initiatives from BGIN to address emerging

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[26] There was a comment during BGIN's discussion that the stablecoin business should be conducted by a bank or other entity with sufficient equity capital in the first place. If the entity has sufficient equity capital, when stablecoin is gone under-per for some reason, they can purchase it themselves and earn arbitrage income while maintaining price stability. In addition, the reason why stablecoin operators have to keep some of their collateral in bank deposits is to respond to immediate redemption requests. But if they have sufficient own capital, they can make short-term funds available within the bank itself. This may increase the efficiency of short-term fund management for the entity as a whole, which also increases the credibility of the stablecoin itself.

[27] There was a comment during BGIN's discussion that recommended issuing AT1 bonds or subordinated bonds with the same characteristics by stablecoin operators. Issuing a bond with a lower repayment ranking than the stablecoin could result in a more secure stablecoin. The fair value of the bonds will also be a good indicator of the creditworthiness of the stablecoin operator.

BGIN is a multi-stakeholder network with an open discussion platform. Its mission, role, and approach are to contribute to ongoing efforts to promote stability, security, and innovation in the blockchain ecosystem.[28] BGIN also explores potential future developments and various initiatives to address emerging risks and promote stability in the DeFi ecosystem. This BGIN paper aims to analyze the instability event in question and to identify possible recommendations to mitigate such events in the future.

The stability of stablecoins is crucial for the broader financial stability of the DeFi ecosystem. The recent instability event discussed in this paper highlights the potential risks and challenges associated with stablecoins, particularly in the context of their use in the financial system. This incident has highlighted the need for greater collaboration and coordination among stakeholders. As the ecosystem is interconnected, it is essential to involve a wide range of actors from both traditional finance and DeFi, including developers, issuers, auditors, regulators, and users, in efforts to mitigate risks and promote stability in the ecosystem. Multi-stakeholder engagement can help ensure that risks are identified and managed effectively, that best practices are shared and disseminated, and that innovative solutions are developed to address emerging challenges. By taking a multi-stakeholder approach, the DeFi ecosystem can be more resilient, innovative, and sustainable, ensuring that it continues to provide value to users and the broader financial system.

Ultimately, humanity dictates how technology is used and it is crucial to consider the fundamental credit risks associated with new financial innovations. There is a need for open discussion. It is also necessary to learn from different stakeholders and their past experiences.

Looking ahead, BGIN is focused on promoting multi-stakeholer discussion thereby fostering initiatives that will further promote stability and innovation in the DeFi ecosystem.

11. Conclusion

The use of technology in finance has the potential to offer innovative solutions to traditional problems, but it is important to be aware of what the technology is supposed to do and to use it in a responsible manner. While existing past instruments and experiences can provide guidance, technology may also offer different ways to address risks without compromising the safety of users and the economy. It is important to be cautious and start small when experimenting with new tools.

The potential impact of stablecoin instability on broader economic stability and financial regulation should be considered, as well as the implications for investors and the broader financial market, including the impact on traditional financial institutions and regulatory bodies.

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[28] For BGIN details, sse BGIN website (https://bgin-global.org/)

Tokenized deposits and banking regulations must also be carefully considered to ensure the safety and soundness of the financial system.

Thus, it is important to consider the lessons learned from traditional financial instruments and experiences when analyzing the risks and potential solutions in the stablecoin and DeFi ecosystem. However, it is also necessary to recognize that technology offers new ways to address some of these risks and protect users and economies from harm. For example, smart contract technology can provide increased transparency and security, allowing for more efficient and trustworthy financial transactions.

It is worth questioning whether stablecoins and DeFi are actually addressing the same problems and risks that "Satoshi Nakamoto" intended to solve with the creation of Bitcoin (Nakamoto, 2018). It is important to consider whether the potential risks and systemic impact of these new technologies are similar to those of traditional financial systems or if they are creating entirely new risks and challenges such as 24/7 settlement, oracle-related risks, and blockchain congestion during runs. This requires a thorough examination of the ecosystem and its potential effects on the wider financial system and real economy.

While this study provides valuable insights into the potential transmission effects of stablecoin volatility, further research is needed to fully understand the extent and implications of these effects. Specifically, future studies could explore how stablecoin volatility affects different sectors of the economy, such as digital markets, payment systems, and liquidity management. Additionally, additional research could investigate how stablecoin volatility interacts with other factors, such as macroeconomic conditions or regulatory changes, to amplify or mitigate transmission effects. Analyzing the price movements of BTC, ETH, and other cryptocurrencies during instances of depegging of stablecoins like USDC and DAI, as well as the price dynamics of other stablecoins besides USDT, and the number of transactions on the Ethereum would be important for future studies.

Appendix A – Acknowledgement

(Informative)

(Note) The views expressed in this report are based on the personal views of the authors and not the views of the organizations to which they belong.

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Blockchain Governance Initiative Network (BGIN) aims at providing an open and neutral discussion platform for all stakeholders to deepen common understanding and to collaborate to address issues they face in order to attain sustainable development of the wider blockchain community. As an open network, we are actively and widely seeking interested parties to join this initiative, so as to accommodate diverse opinions from a wider range of blockchain stakeholders.

Appendix B – Informative reference

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