
Opinion piece

Blockchain technology as a potential risk source and a risk mitigator: US reflections and outlook

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Mark Cianci

Counsel, Ropes & Gray LLP, USA

Mark Cianci is counsel in the Boston office of Ropes & Gray LLP. His full bio is available here: <https://www.ropesgray.com/en/biographies/c/mark-cianci>.

Prudential Tower, 800 Boylston St., Boston, MA 02199-3600, USA

Tel: (617) 951 7122; E-mail: mark.cianci@ropesgray.com

Xochitl Strohbehn

Litigation Partner, Venable LLP, USA

Xochitl Strohbehn is a litigation partner in the New York office of Venable LLP. Her full bio is available here: <https://www.venable.com/professionals/s/xochitl-s-strohbehn>.

Venable LLP, 151 W. 42nd Street, 49th Floor, New York, NY 10036, USA

Tel: (212) 370 6224; E-mail: xochitl.strohbehn@venable.com

John King

Litigation Associate, Ropes & Gray LLP, USA

John King is a litigation associate in the Boston office of Ropes & Gray LLP. His full bio is available here: <https://www.ropesgray.com/en/biographies/k/john-king>.

Prudential Tower, 800 Boylston St., Boston, MA 02199-3600, USA

Tel: (617) 854 2050; E-mail: john.king@ropesgray.com

Abstract Cryptocurrency, its risks, its volatility, and recent collapses of crypto-related firms have been splashed across the news for years. It is therefore unsurprising that recent developments surrounding disruption in the US banking system have thrust cryptocurrency into the spotlight again, with conventional financial analysts debating the degree to which blockchain-related institutions and products may have contributed to recent bank runs and instability. In the meantime, many US regulators have tended to focus on the potential downsides and risks of blockchain technology, and have recently increased the intensity of their enforcement activities against crypto market participants, often premised on decades-old legislation and case law. In the context of these broad trends, an underexplored idea is that greater integration of blockchain technology into the mainstream financial system could actually reduce bank run risk. If that is right, certain US regulators should modulate their approach and devote further resources to fostering a healthy adoption of blockchain technology within the financial system. Against that backdrop, this paper explores the potential capacity of blockchain technology to curtail widespread risk in the

financial system, suggests that blockchain technology indeed has significant power to act as a risk mitigant, offers some practical observations as to how blockchain adoption could improve the risk profile of financial systems, and concludes that the promise of blockchain technology in this regard should spur US regulators to foster and promote the growth of blockchain.

Keywords: *blockchain, cryptocurrency, banking crisis, smart contracts, liquidity risks, stablecoins, banks runs*

THE BASICS OF BLOCKCHAIN-BASED FINANCIAL SERVICES — CEFI AND DEFI

There are two primary forms of blockchain-based financial services: centralised cryptocurrency exchanges and other centralised services (eg Binance) and decentralised communities (eg SushiSwap).

Centralised finance (CeFi) services, such as cryptocurrency exchanges, operate through centralised institutions akin in certain respects to stock exchanges.¹ Like stock exchanges, transactions are completed on cryptocurrency exchanges through accounts that users set up to complete their trades.² Cryptocurrency exchanges may also offer more traditional services such as lending, margin, and borrowing.

Decentralised finance (DeFi) services operate quite differently — transactions are completed peer-to-peer, ie directly between one user to another.³ Parties to DeFi transactions can be matched by automatic market-makers relying on protocols, DeFi transaction pricing is usually determined by algorithms, and DeFi transactions generally take place via ‘smart contracts’, self-executing pieces of code that run when parties’ contractual terms are satisfied.

STRENGTHS, WEAKNESSES, AND POTENTIAL RISKS OF CRYPTOCURRENCY FINANCIAL INSTITUTIONS AND PROTOCOLS

DeFi and CeFi services have distinct technological strengths and weaknesses that stem from their respective methods of operating. While DeFi offers control, transparency, and accessibility to its users, it also exposes users to some downsides.

DeFi code execution permits users to directly verify that transactions are completed, which creates

certain transparency advantages as compared to a CeFi context, where transactions are conducted through an intermediary and therefore completed in a more opaque manner. DeFi users — who generally retain custody of their assets — have greater control over their assets than CeFi users do. As a result, DeFi users do not have to wait for a centralised institution to respond to a request or risk a loss caused by a court ruling that customer assets belong to an *exchange*.⁴

However, retaining custody of their assets may expose DeFi users to risks of loss arising from technology-related hazards, eg hacks. A relatively recent example is instructive. On 9th April, 2023, DeFi protocol SushiSwap was hacked through a bug in a smart contract, resulting in US\$3.3m in losses — which SushiSwap has now decided to ‘refund’.⁵ Had SushiSwap elected not to ‘refund’ these losses, users may have had no other way to recover them. Risks of this kind are generally less likely to arise in a CeFi context, where there may be more controls for preventing such losses and where technology-driven issues are less likely to arise. That said, CeFi services are still vulnerable to risk of loss resulting from hacks and other technological challenges, as well as loss from institutional disruptions and bankruptcies (such as occurred at FTX).⁶ Moreover, CeFi organisations have also been subject to attacks by third parties, and customers’ funds are at risk if institutional security protections fail.⁷ Likewise, if customers lose trust, CeFi institutions risk experiencing ‘runs’ that could lead to institutional collapses of the type reflected in the recent banking crisis.

Although DeFi and CeFi are theoretically different aspects of the crypto economy, which has been defined as ‘not just another tech sector’ but instead a ‘different way of doing the economy’,⁸ in practice, there is overlap between the two. Indeed, some have

characterised CeFi and DeFi as ‘heavily intertwined,’ with CeFi serving as a significant source of funds used to conduct transactions in DeFi communities.⁹ The interactivity between CeFi and DeFi requires an analysis of potential weaknesses and strengths from operating in a combined CeFi–DeFi system.

Celsius, a now-bankrupt crypto lender, offers a real-world example of the potential strengths and weaknesses of a CeFi–DeFi combination. Celsius, which has been characterised by its founder, Alex Mashinsky, as a combination CeFi and DeFi,¹⁰ claimed to be operating a DeFi platform by ‘utilizing . . . smart contracts and open ledgers to allow users to earn the highest yield on their crypto assets’, while simultaneously maintaining a CeFi operation by ‘aggregating custodial wallets that allow borrowing and earning yield for [its] users’.¹¹ As its financial distress later revealed, Celsius borrowed heavily from DeFi actors such as Compound, Maker and Aave¹² in order to conduct various transactions. When digital assets’ prices plummeted, Celsius (along with others) found itself scrambling to meet requests for withdrawals and demands to post more collateral to secure loans.¹³ Parties who had borrowed through a DeFi protocol and were unable to meet the demand for additional collateral found their positions automatically liquidated through a smart contract (or contracts).¹⁴

Recent experience has demonstrated that combined use of CeFi and DeFi offers strengths and weaknesses that differ from the respective strengths and weaknesses offered by CeFi or DeFi individually. Under current conditions, when used simultaneously, CeFi/DeFi allows traders to engage in leveraged trades without restriction, which creates an opportunity to generate greater returns than are possible when reliance on leverage is more restricted. But in a downturn, like the recent crypto winter, combined use of CeFi and DeFi can exacerbate price drops. Smart contracts operating via DeFi can be (and typically are) coded with conditions that require parties to post significant collateral. When values drop, these smart contracts require users to post additional collateral, and then liquidate positions if collateral calls are not met, which can further depress asset values and lead to more liquidations.¹⁵

US BLOCKCHAIN LEGISLATION: POTENTIAL MISALIGNMENT BETWEEN CRYPTO AND TRADITIONAL FINANCE

US regulators — who are growing more and more aggressive in their quest to rein in cryptocurrency institutions and digital assets — are currently relying on enforcement powers promulgated pursuant to existing (and often decades-old) legislation and case law. Indeed, enforcement actions taken by the US Securities and Exchange Commission (SEC) and the US Commodities Futures Trading Commission (CFTC) have relied in large part on efforts to frame crypto institutions and assets as falling within the traditional definitions of securities and derivatives/futures that permit the SEC and CFTC, respectively, to act.¹⁶ Likewise, in addressing the recent banking crisis, the US Federal Reserve and the US Federal Deposit Insurance Corporation (FDIC) have relied on existing legislation for their authority to intervene.

The Federal Reserve and FDIC appear so far to have prevented a contagion effect resulting from the recent banking disruption involving Signature Bank, Silicon Valley Bank, Silvergate Capital and First Republic Bank, but that does not mean that the banking system’s existing regulatory tools (and the legislation upon which those tools rest) or available capital sources are fully up to the task of managing volatility and liquidity risks and preventing future crises. Likewise, while the SEC and CFTC have been quite aggressive in their pursuit of enforcement actions against cryptocurrency institutions and actors, some believe that the legislation underlying the SEC’s and CFTC’s respective regulatory authority may not be best positioned to maximise the potential benefits (and minimise the potential risks) generated by blockchain technology.¹⁷

For example, a relatively recent report by the US Financial Stability Oversight Council (FSOC) identified several perceived blockchain-related risks that it views as falling outside the realm of existing regulations and legislation.¹⁸ Chief among the perceived risks that FSOC believes must be addressed are (1) ‘spot trading of crypto assets not considered securities’; (2) ‘regulatory arbitrage, where market participants seek to take advantage of

different rules among agencies'; and (3) 'lack of traditional intermediaries, such as brokers and clearinghouses, in transactions involving retail investors'.¹⁹ Regardless of whether these critiques are warranted, it is significant that FSOc apparently believes that, if these perceived risks are not addressed by adequate regulation and legislation, cryptocurrency-related activities could undermine the stability of the US financial system as these activities grow increasingly interconnected with traditional financial activities.²⁰

Regulators and government actors have also identified what they view as potential DeFi-related risks. For example, at least one SEC commissioner has identified potential DeFi risks such as retail investors' perceived lack of transparency into who funds DeFi projects and the kinds of arrangements related to that financing, retail investors' alleged inability to evaluate the quality of investments, and investors' perceived inability to discern whether trades are being completed by investors with a legitimate interest in the underlying investment (or instead reflect an effort to manipulate markets).²¹ As another example, the Federal Reserve has recognised the potential for DeFi to create a 'sparkling event' that could lead to a financial crisis, especially as DeFi becomes more widespread.²² More specifically, the Federal Reserve noted several types of potential risks, including that automated liquidations pursuant to smart contracts 'could facilitate extreme price moves' and that traditional financial institutions providing services to cryptocurrency users could face significant losses, reputational harm, and possibly legal liability.²³

CURRENT TRENDS: CRYPTO FINANCIAL INSTITUTIONS AND DIGITAL ASSETS

Previously high-flying digital assets and cryptocurrency institutions came crashing back to earth during 2022, a year that was marked by two overarching events: (1) the onset of a 'crypto winter', in which digital asset values fell significantly; and (2) a cascade of crypto exchange failures and bankruptcy filings by numerous crypto financial institutions, eg FTX and Voyager.²⁴ These events significantly dampened investors' appetites for digital

assets and sharpened regulatory scrutiny of digital assets and cryptocurrency financial institutions.

These higher profile events were accompanied by distress among DeFi protocols, which experienced significant drops in value at the same time that digital assets' prices plunged.²⁵ Others have noted that there are no publicised instances of DeFi organisations failing.²⁶ The lack of known failures does not mean that DeFi protocols, certain of which some commentators argue are 'decentralised in name only',²⁷ did not suffer, and are not suffering, distress as CeFi organisations have and are. Indeed, both the DeFi and CeFi sectors experienced significant drops in value during 2022.²⁸

Some have opined that at least some of the stress experienced by CeFi players, such as Celsius, was due in part to their use of DeFi to incorporate 'unrestricted' leveraged trades in the cryptocurrency markets.²⁹ As these commentators have noted, the ability to conduct trades in an 'unrestricted' way allowed CeFi actors to create and execute strategies that relied on re-hypothecating digital assets over and over.³⁰ When the crypto winter set in and digital assets' values dropped, CeFi institutions (for example, Celsius) found themselves scrambling (and ultimately unable) to cover users' withdrawal requests at the same time as DeFi protocols required CeFi to post additional collateral to avoid liquidation thresholds.³¹ As liquidations set in via smart contract execution, total values locked on DeFi projects dropped.³²

The trends of distress in and regulatory scrutiny of the cryptocurrency markets and firms that took hold in 2022 have continued into 2023. Thus far, there have been multiple bankruptcy filings (including by Genesis Capital and Bittrex³³), and numerous crypto exchanges and firms have been conducting layoffs, closing offices, or undertaking other cost reductions.³⁴ For example, Coinbase announced that it would cut 20 per cent of its workforce and implement a restructuring plan to reduce costs.³⁵ As yet another example, Singapore-based Crypto.com laid off about 20 per cent of its workforce just months after completing an earlier round of layoffs.³⁶

In addition, the emphasis on finding legislative and regulatory solutions to real or perceived risks arising from cryptocurrency has continued in 2023.

Regulatory and legislative scrutiny has remained high,

with both Congress and the Biden administration continuing to consider whether legislation is needed to address perceived risks exposed by events during 2022³⁷ and the SEC and CFTC continuing to aggressively pursue enforcement actions across the cryptocurrency and digital asset spectrum. For example, in March and June 2023, the SEC and CFTC targeted two of the largest cryptocurrency institutions in the world — Coinbase and Binance.³⁸ These well-publicised actions follow on the heels of numerous other enforcement actions brought against prominent individuals, such as Kim Kardashian³⁹ and Do Kwon (founder of TerraUSD and LUNA),⁴⁰ as well as blue chip cryptocurrency institutions such as the exchange Gemini and the lender Genesis Global Capital.⁴¹

THE RECENT BANKING CRISIS

On 8th March, 2023, Silvergate Capital, a prominent crypto bank that had served as a banking provider for crypto exchange FTX, announced that it would voluntarily liquidate after the implosion of FTX contributed to Silvergate's shares tumbling by roughly 35 per cent.⁴² On 10th March, after a wave of its customers frantically attempted to withdraw their accounts, Silicon Valley Bank (SVB) collapsed, the largest failure of a US bank since the 2008 global financial crisis.⁴³ Two days later, the FDIC shuttered Signature Bank⁴⁴ after a bank run, triggered by customer concerns that Signature would follow SVB. And four days after that, on 16th March, 2023, First Republic Bank (First Republic) received an emergency infusion of roughly US\$30bn in cash from American lenders — a move that followed an emergency meeting between US Treasury Secretary Janet Yellen, JPMorgan Chase CEO Jamie Dimon, and Chair of the Federal Reserve Jerome Powell.⁴⁵

The emergency infusion of US\$30bn, and First Republic's subsequent heavy borrowing ultimately only delayed First Republic's eventual collapse. On 1st May, 2023, First Republic failed and was closed by the California Department of Financial Protection and Innovation.⁴⁶ The FDIC was appointed Receiver the same day, with JP Morgan Chase Bank, NA acquiring all of First Republic's deposits and most of its assets.⁴⁷ Under the terms of JP Morgan's acquisition of First Republic, losses on

First Republic's loans will be shared with the federal government.⁴⁸

Although the crises at First Republic, SVB, Silvergate, and Signature Bank have now largely been resolved, that does not mean that the US regional bank sector is in the clear. On the contrary, investors' sell-offs of regional bank shares continued even after First Republic was shuttered.⁴⁹ Moreover, there is concern that assets held by banks are not sufficient to meet demands for withdrawals, a concern that is likely to be linked to the fact that the value of assets (specifically loans) held by regional banking institutions has declined amid the Federal Reserve's ongoing rate-raising march.⁵⁰

In the aftermath of these collapses, many have reverted to debating an old question: is traditional finance truly insulated from the risks and volatility of cryptocurrency? At first, many economists had looked at crypto markets and traditional finance as two separate systems.⁵¹ However, others posited that the breadth of connections between crypto markets and traditional finance often causes risk from the latter to spill into the former, and vice versa.⁵² In January, three US Senators criticised Silvergate for this very reason, claiming that the bank 'further introduced crypto market risk into the traditional banking system' when it secured a US\$4.3bn advance from the Federal Home Loan Bank of San Francisco.⁵³

Analysts on the other side of this debate do not claim that traditional finance *is* insulated from crypto market risk. Rather, they maintain that, really, crypto entities are on equal footing with any other company that deposits money; thus, SVB collapsed merely because it was too concentrated in the West Coast Technology industry, and that group of customers has a shared sensitivity to the volatile crypto market. For example, Circle Internet Financial, manager of the stablecoin USDC, had sizable deposits with SVB. When Circle inferred that SVB might fail, its request to withdraw that significant deposit reportedly vastly exacerbated the bank run.⁵⁴

Whatever the framing, crypto markets or actors created some of the risk that at least partly caused Silvergate's collapse. Indeed, Silvergate reported a US\$1bn loss for Q4 2022 after investors withdrew over US\$8bn in deposits following FTX's collapse

and the ongoing deposit drain put immense strain on Silvergate.⁵⁵

The rush for withdrawals at Silvergate can be linked to some degree to the volatility in digital asset values and related drops in value caused initially by TerraUSD's depegging and the resulting collapse of CeFi lenders and exchanges, including FTX. In contrast, the collapses of SVB and First Republic and the closure of Signature Bank cannot be so easily linked to the contagion that ignited with Terra USD's loss of its peg and continued through the collapse of FTX, Gemini, and Bittrex. Indeed, experts have opined that, with respect to these failures, crypto is nothing more than a 'bystander' and that these failures occurred because of regulatory insufficiency and a lack of diversification of collateral.⁵⁶

USING BLOCKCHAIN TECHNOLOGY TO MITIGATE RISK

But are reservations about the potential spillover of crypto market risk into traditional financial systems obscuring blockchain technology's risk mitigation potential? Many have debated how and to what extent blockchain technology exposes banks to potential risks, but few, it seems, have contemplated how blockchain technology could reduce the risk of bank runs.

SVB is a case study in how blockchain may have helped avert a crisis. SVB's true problem was a lack of liquidity during the bank run, which many blame on the Federal Reserve, given its duty to act as a lender of last resort during those periods. While some speculate that SVB lacked the collateral necessary to borrow enough from the Federal Reserve to cover the run deposits, others note that SVB's portfolio of government-backed securities — with a fair-market value of US\$102.2bn as of 31st December — should have been sufficient.⁵⁷

The initial rescue of First Republic Bank demonstrates that a swift lending solution could have averted the SVB disaster. But not many banks can reasonably rely on Mr Powell, Mr Dimon and Ms Yellen to hastily devote themselves to 'two days of frantic phone calls, meetings and . . . arm-

twisting' to broker a near-unprecedented deal with the CEOs of 11 of the nation's largest banks.⁵⁸

Even if banks could rely on such action, the initial First Republic solution still may have been too slow to help SVB, and the subsequent failure of First Republic suggests that the best 'cure' is prevention of a run to begin with. In 12 days, the SVB and Signature Bank collapses cost the US Federal Reserve US\$140bn in deposit guarantees. But the bank run that caused SVB's failure occurred over just two days. On 8th March (when Silvergate announced it would liquidate), SVB announced it intended to raise US\$2.25bn via common equity and preferred convertible stock. The next day, SVB's stock collapsed by 60 per cent, causing a panic among venture capital firms, and a subsequent mass withdrawal. California regulators shut down SVB on 10th March, 2023.⁵⁹

While the initial First Republic deal (which ultimately failed) was executed in just a few days, 'regulators were already scrutinizing First Republic' and its heavy losses as of 13th March, and 'raising the prospect of emergency government intervention' before then.⁶⁰ Regulators and traditional financial actors were far less prepared for SVB. As a result, SVB could not rely on support from the government or other banks, and the market did not have the appetite to send SVB a lifeline when it attempted to raise capital. Faced with a bank run that would shut it down within a few days, perhaps a few hours, where else could SVB have turned to either avoid the bank run altogether or avert disaster?

Imagine if SVB could have accessed an alternative source of liquidity to staunch its losses while regulators and lenders crafted a longer-term solution. Perhaps the crypto economy — which operates 24 hours per day, 365 days per year⁶¹ — and blockchain technology, which some predict could provide an alternative to our traditional system of fractional reserve banking, could reduce bank run risks and avert disaster in the future.

For SVB in particular, it would be hard to exaggerate the value of a quick and always-accessible source of liquidity, particularly because SVB served 'a very networked group of sophisticated customers' who could be 'quite quick to move their money'.⁶² According to Bloomberg Opinion columnist Matt Levine, SVB catered to a very specific group of

highly connected, ‘disloyal’ depositors who presented a unique risk: ‘Traditional banks do not have customers who will spring into action to set up a telephone chain to cause a bank run. But Silicon Valley is efficient and scalable, so they got their money out fast’. Indeed, SVB’s collapse has highlighted a deeper concern for all traditional banks: the online bank run. Online banking decisions fuelled by rapidly spreading online information demonstrate new liquidity risk challenges such as the speed at which panic can spread — a point emphasised by the fact that SVB customers withdrew US\$42bn in just 24 hours.⁶³ SVB customers used a variety of rapidly responding forums — e-mail chains, text groups, messaging applications, telephone chains etc. — to collectively decide to move their money.⁶⁴

Banks could at least possibly identify potential bank run risks if customers were openly sharing their plans to withdraw their funds on social media. But when significant depositors communicate on closed messaging networks such as those used for SVB, banks have fewer opportunities to identify the risk. And if unidentified risk leads to depositor panic during night and weekend hours, banks may not even have the opportunity to raise sufficient capital swiftly enough to head off a panic.⁶⁵ Against that backdrop, the ‘always on’ philosophy of the crypto ecosystem, consisting of both CeFi and DeFi platforms, has the potential to permit banks faster access to collateral and capital. It also has the potential to allow banks a way to publicise the type of capital to which they have immediate access.

If, for example, SVB had had on-chain access to backup liquidity — such as baskets of stablecoins (backed by more traditional assets such as fiat currency or commercial paper) — it might have been able to withstand the crisis, especially if access to that liquidity were triggered automatically by execution of smart contracts. Potential sources of liquidity for banks and other financial institutions could include smart contracts that are programmed to gather significant reserves of a blend of the highest quality stablecoins upon depositors’ demands for withdrawals reaching a preset level. The stablecoins could be issued by current stablecoin sources such as Circle, which could agree in advance (in self-executing smart contracts) to accept certain grades of

bonds, such as the long-term government bonds held by SVB, in exchange for issuance of stablecoins.

This structure would enable banks to signal to their depositors and the market as a whole that their institutions can withstand depositors’ demands for return of their money. Banks could also use blockchain technology to signal their access to capital to the public, including by pointing to transactions entered on the blockchain representing assignment of reserved stablecoins to the institution in question. The entry of the transaction could then be used to assure the public of institutional access to stablecoins and their reserves, which may reduce the risk of a panic caused by investors’ fear of losing their deposits. Relying on a basket of highest quality stablecoins denominated in numerous fiat currencies may limit the risk of a significant macroeconomic event concentrated in one country or of a related (or standalone) depegging event (such as that experienced by Circle in March 2023⁶⁶).

CONCLUSION

The risks of the crypto economy are now well known, but probably do not outweigh the potential benefits of relying on this ‘always on’ source of capital as a means of avoiding bank runs and ensuring fast access to capital without having to rely on the more slow-moving pace of negotiations in a TradFi environment. The flexibility and highly programmable nature of blockchain-based financial products are prompting deeper conversations about the future of banking in an environment where communication is quickening and confidence in existing infrastructure is waning. The recent banking crisis has shown how the status quo of traditional finance may endanger our fractional reserve banking system, which requires a high degree of depositor trust given that, fundamentally, banks never have the liquidity to repay all their depositors at once.⁶⁷ And so, as in 2009 and during prior crises, some are entertaining alternatives or enhancements to fractional reserve banking, and these could very well include on-chain smart contract solutions, as detailed above.⁶⁸ Given the promise of blockchain technology, many US legislators and regulators would be well served to

revisit the more sceptical approach that they have taken towards blockchain adoption. Instead, by embracing and supporting the growth of blockchain, US legislative and regulatory actors could promote a more stable and secure financial ecosystem, buttressed by the always-on, highly programmable, automatically executable, and virtually infinitely scalable features of blockchain technology.

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