Analysis

Instability in crypto-asset markets is a reminder of the risks and underlines the need for regulation

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The instability seen in crypto-asset markets has had very little effect on the global financial system, but the growing and partially hidden linkages between markets are a cause for concern. The introduction of distributed ledger technology (DLT) in the financial markets may also create new risks. The sector needs tighter regulation and supervision particularly because of failures that have been related to investor protection and anti-money laundering measures. Europe is leading the way in regulating the sector, with the adoption of the Markets in Crypto-Assets Regulation (MiCA).



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The crypto-asset sector refers to payment, financing and trading services executed using distributed ledger technology[1] (i.e. decentralised finance, DeFi[2]) and to the related crypto-asset service providers[3]. The most common distributed ledger technologies are blockchains[4] in which crypto-asset[5] holdings, account transactions and software can be recorded. 'Crypto-asset markets' refers to trading platforms for crypto-assets and more generally the market prices of these assets.

Strong price movements in crypto-asset markets and the scams that have emerged have attracted widespread attention in recent years. This instability in crypto-asset markets has started to be felt in the global financial system, causing problems for private investors, investment funds, companies and banks. A topical issue at present is therefore whether the crypto-asset markets and distributed ledger technology are beginning to pose a threat to financial stability.

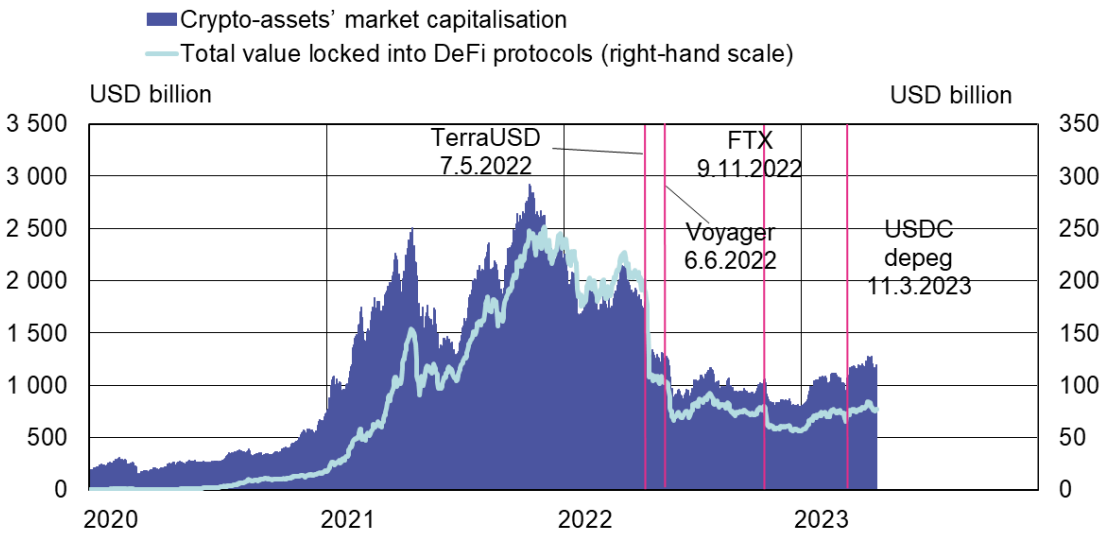
This article first examines the events that have taken place in the crypto-asset markets, as these illustrate the linkages between the crypto-asset sector and the global financial system. It then goes on to discuss the hidden technological and governance risks of crypto-assets, at the level of the basic infrastructure maintaining the blockchains. The article concludes by discussing current and future regulation of the crypto-asset sector.

Crypto-assets' total market capitalisation[6] surged rapidly towards the end of 2020 (Chart 1). The rise was accelerated by the growing interest of private and professional investors (such as private equity funds and individual companies)[7] in crypto-assets. The total market capitalisation started

to decline at the end of 2021, reflecting the general decrease in risk appetite in global financial markets. Geopolitical tensions and expectations regarding monetary policy tightening contributed to a decline in the prices of the highest risk investments, including crypto-assets. Price volatility has been very strong for a number of crypto-assets, and many large crypto-asset market participants have faced problems. The downturn in the crypto-asset markets has been referred in the sector as the 'crypto winter'.

Chart 1.

Crypto-assets' market capitalisation and total value of crypto-assets locked into DeFi protocols



Sources: Macrobond and DeFiLlama.

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The sharp fluctuations in the prices of crypto-assets are also partly explained by the increasing popularity of financial services provided on blockchains. Chart 1 shows a strong correlation between assets used in DeFi services[8] and the total market capitalisation of crypto-asset markets. The correlation illustrates the internal credit cycle of the crypto-asset markets, in which a rise in asset prices leads to a rise in the collateral values of loans and an increase in leverage. In a bear market, the automated liquidations of collateral that are characteristic of crypto-asset lending services amplify market corrections. DeFi does not include regulations on the reuse of collateral for investment purposes, or tools for mitigating systemic risks. On the global financial markets, similar risks are mitigated by, for example, setting risks weights on the financial instruments used as collateral and by limiting large exposures.

Growing instability in crypto-asset markets has revealed connections between participants

A fall in the crypto-asset markets triggered an increase in general mistrust, particularly following the decline in the Terra stablecoin's value below its intended worth of USD 1 in May 2022. Terra was pegged to the US dollar, and collateral based on the Luna crypto-asset was used to stabilise Terra's value. At its peak, Terra's circulation value was USD 18 billion. Confidence in Luna's collateral value started to collapse rapidly, even though the protocol's unsustainable financial structure was evident beforehand.[9] The collapse led ultimately to the price of Terra tumbling from USD 1 to less than one cent. The drop in the prices of Terra and Luna caused a number of contagions via assets tied to DeFi lending services and to trading pairs.[10] In addition, large, centralised crypto-asset market participants, such as Voyager, collapsed as a result of the contagions, because they had deposited client assets in DeFi services.

In November 2022, a huge crypto-asset market scam was discovered as the misuse of client assets on the FTX cryptocurrency exchange platform came to light. The most significant element of the fraud in practice involved the lending of FTX client assets. Collateral for the loans was the FTX-issued token FTT, the price of which was kept artificially high. An article published by the news platform Coindesk on 2 November 2022 triggered concerns about the liquidity of FTX.[11]

Concern in crypto-asset markets often rapidly leads to a liquidity crisis and is thus comparable to a traditional deposit run in the banking sector, because the crypto-asset sector lacks supervision and regulation to a significant extent and the market does not have stabilising protection mechanisms like deposit insurance. The emergence of liquidity crises has also been attributable to the poor transparency of companies in the sector regarding their financial position and asset quality. The collapse of FTX also showed how confidence in individual private entities in crypto-asset markets can grow to huge proportions, and how rapidly this confidence can be lost. The FTX case is not unique. Similar indications of scams have been found in the activities of many other crypto-asset companies that have entered insolvency proceedings, at least concerning breaches of rules on accounting, holding of client assets and insider dealing. More cases of market abuse may emerge as authorities' interpretations of the regulations become more established and supervisory resources improve. Crypto-asset services may therefore, in the future too, be subject to deposit runs and an increase in internal market distrust, as in the case of FTX.

Deposit runs in crypto-friendly banks

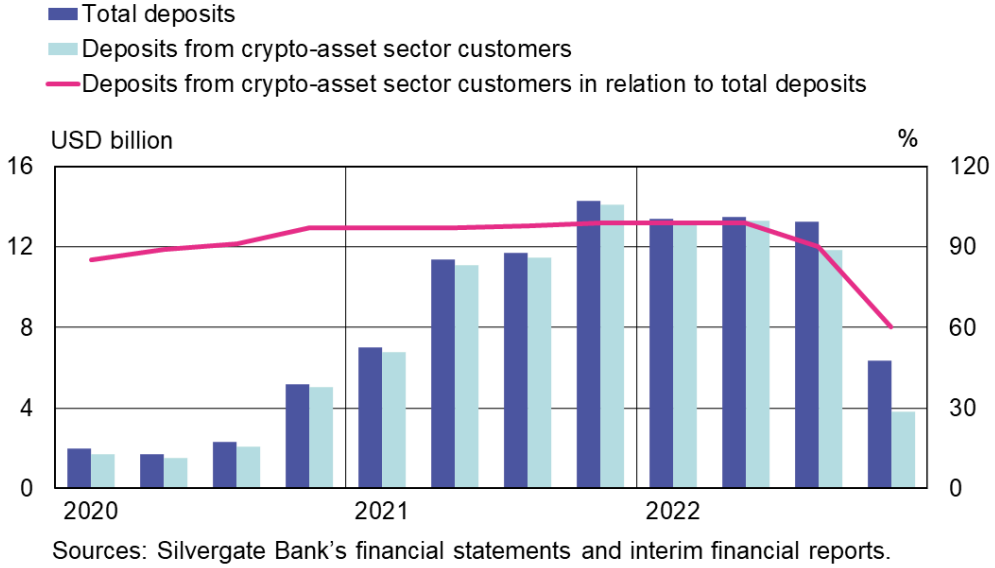
Links to the crypto-asset sector were also a minor contributory factor[12] in the US banking sector

turbulence of spring 2023.[13] Individual banks with the strongest links to the crypto-asset sector started to have profitability issues as a result of the difficulties of crypto-asset companies and the hedge funds that had invested in them. Overall, however, the banking sector's direct exposures to crypto-assets are insignificantly small.[14]

The bank with the strongest links to entities in the crypto-asset sector was Silvergate Bank, which had grown rapidly by focusing on the sector.[15] Its total deposits grew sharply in 2020–2021 (Chart 2). The operating conditions for Silvergate deteriorated rapidly towards the end of 2022 because of the difficulties faced by its customers. In the last quarter of the year, crypto-asset sector customers withdrew a substantial amount of deposits from the bank. On 8 March 2023, Silvergate announced its intent to voluntarily wind down operations.

Chart 2.

Silvergate Bank's total deposits focus on deposits from crypto-asset sector customers



Sources: Silvergate Bank's financial statements and interim financial reports.

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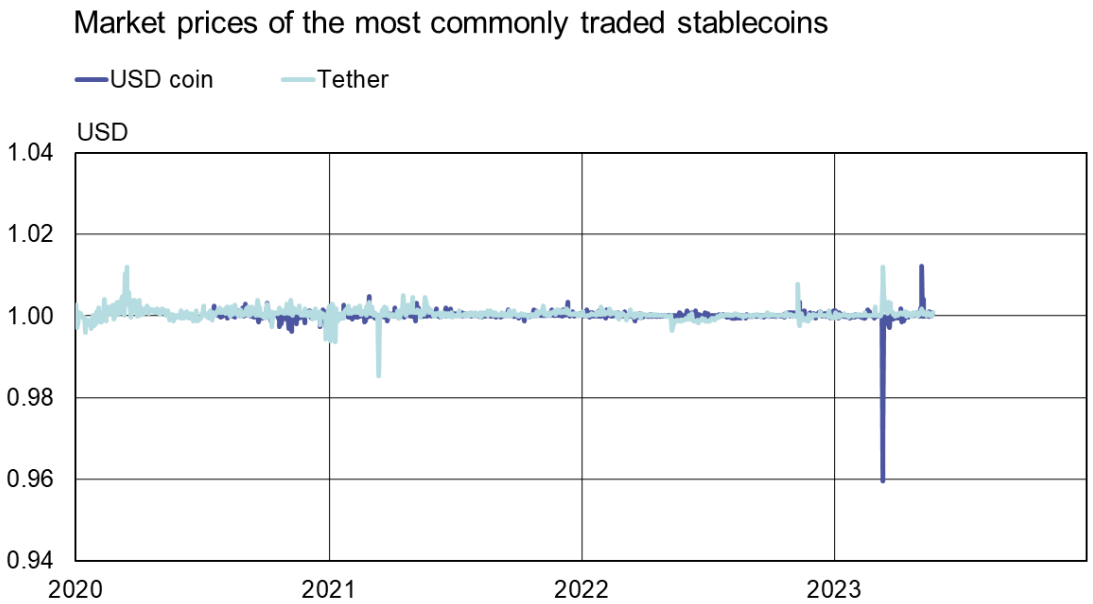
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Signature Bank was another crypto-friendly bank that collapsed in early 2023.[16] The bank had experienced a deposit run due to the general uncertainty concerning regional banks in the United States.[17] Although Signature, too, had close connections with the crypto-asset sector, it had a broader business model than Silvergate Bank, as its deposits from crypto-asset sector customers accounted for only about a quarter of total deposits at most. Signature Bank was also being investigated by US prosecutors for possible breach of money laundering regulations.[18]

Silicon Valley Bank (SVB) collapsed on 10 March 2023 as a result of its concentration risk, as the bank's business model was narrow, being based on services to technology sector start-ups and private equity firms. SVB's failure was also attributable to corporate mismanagement and regulatory failings.[19]

One of SVB's crypto clients was Circle, the issuer of USD Coin (USDC). USD Coin is one of the most widely used so-called 'stablecoins' in the crypto-asset markets. A portion of the client funds backing USD Coin was deposited at SVB, and, on Saturday 11 March 2023, because of concerns about losing these reserves, USD Coin temporarily lost its 1-to-1 peg with the US dollar – the fixed value promised by Circle (Chart 3). The market price of USD Coin returned to its fixed rate of USD 1 within three days. As in the case of Terra, the de-pegging of USD Coin had strong contagion effects in the crypto-asset markets, as the problems spilled over to other DeFi services. This was because USD Coin is used as collateral and as a trading pair in many DeFi services.

Chart 3.



The run on the USD Coin stablecoin had no spillover effects on the global financial markets, however. Issuers of the largest stablecoins use client funds to purchase sovereign and corporate bonds, so in the event of a deposit run there might be pressure to sell bonds. The largest stablecoins have a circulating supply of USD 83 billion (Tether) and USD 28 billion (USDC Coin).

Instability in crypto-asset markets could lead to higher financial stability risks through wealth and

confidence effects, financial sector exposures and a greater use of crypto-assets as a form of payment.[20] It currently appears that the connections between crypto-asset markets and the global financial system are still limited. However, with crypto-asset markets growing rapidly and because the events of the crypto winter show that direct and indirect linkages have been increasing, there is good reason to expand the amount of monitoring. This growth, and the adoption of new technological solutions in financial market services, could lead to a rapid increase in the significance of these linkages.[21]

Blockchain technology will bring new governance and technological risks

Among distributed ledger technologies, permissionless blockchains have attracted the most attention. Permissionless blockchains are ledgers in peer-to-peer networks that are not controlled by any single entity. Network maintainers include nodes, block producers (miners or validators) and developers. Nodes store and relay data. Miners record new transactions in the ledger. They compete in a proof of work (PoW) blockchain for the right to add new blocks to the blockchain, for which they are rewarded with, for example, Bitcoin. Winning the right to produce a block is a matter of chance, but greater computational power increases an entity's probability of winning the right to produce the next block.

In a proof of stake (PoS) blockchain, the probability of winning the block production right does not depend on physical hardware, but instead on the amount of crypto-assets an entity holds and stakes to keep the blockchain secure. Each block producer can decide which of the incoming transactions they wish to store in the latest block, and in which order. Blockchain software is maintained by a group of developers (e.g. Bitcoin Core) who create version updates. Since all three maintainer groups – nodes, producers and developers – have an effect on the functioning of the system, the governance model of a permissionless blockchain is unclear and difficult to predict, causing substantial risks for individual investors and for the system's reliability.

The aim of a peer-to-peer network is that no single entity can gain control over it. In permissionless blockchains, however, it is possible to purchase a controlling share anonymously, as anyone is free to join the system and become a maintainer. Centralization of control is also supported by empirical data, which suggests that, in the case of the Bitcoin network, for example, the collusion of just four entities would be enough to manipulate or disrupt the system.[22]

Therefore, in a scenario where the linkages between the financial sector and permissionless blockchains are strengthening, unidentified maintainers would pose a risk to financial stability. The security framework for blockchains naively assumes that having capital locked in nodes and in

block production will prevent misconduct. With centralisation of control, however, the possibility cannot be excluded that the rules governing a blockchain will be modified to suit the controlling maintainers. If the global financial system were to become highly dependent on permissionless blockchains, this would also open up the possibility of cyberattacks that are not motivated by financial gain. The new governance risks inherent in permissionless blockchains highlight the need to extend regulation to cover entities that maintain such blockchains.[23] In addition, surprises and critical errors still occur in the technical operation of blockchains. If technical or governance risks materialise, potential consequences could include a standstill in the operation of the whole network, manipulation of transaction history, or a collapse in the value of crypto-assets.

The rationale behind permissionless blockchains is to replace trust in third parties with a decentralised system where the rules are transparent for all and no single party can change them. If some centralised entity attempts to change the rules of a blockchain's basic protocol, then the characteristic social protection mechanism of blockchains is to fork into two separate blockchains. If some members of the community do not want to support the amended rules, they can continue using the old chain. This is what happened with the Ethereum blockchain in 2016, for example, when hackers stole 3.6 million Ether from a faulty smart contract and the Ethereum community voted in favour of returning the funds. Some members of the community opposed this, because there had been no defect in the basic blockchain protocol. As a result, Ethereum Classic remained as a separate fork of the blockchain, where the funds were not returned.[24] Due to this fork, crypto-assets became duplicated on both blockchains. The prices of these are determined in the markets on the basis of future expectations for each blockchain.

The example above shows that, in the event of changes to the rules of a blockchain protocol, services built on top of the blockchain can also exercise centralised power. For example, many centralised service providers exist within Ethereum's infrastructure, such as market places, stablecoin issuers, lending services, wallet service providers, nodes and oracles[25]. These entities could drive changes in the rules, and users would have financial incentives to accept them. Therefore, the fundamental assumption that blockchains sustain their decentralised nature does not seem to be reliable with regard to exercise of control by entities providing services built on top of blockchains, or with regard to entities maintaining a blockchain. With the lack of regulation of the crypto-asset sector, there is a greater potential for the concentration of market power, or, in the extreme, the creation of monopolies.

European Union leading the way in regulating crypto-asset markets

Instability in crypto-asset markets has led to investment losses, and the suspension of activities by major crypto-asset service providers (CASPs) has led to assets becoming stuck on their platforms. In addition, there have been many cases of failure to comply with measures to prevent money laundering and terrorist financing. The European Commission and the ECB, among others, have highlighted the need to step up and harmonise regulation of crypto-asset markets.[26,27] Regulation in this area has been based on national laws, and so far this has been very fragmented, with significant variation between countries.

It is hoped that new regulation will take a position on issues related to the definition of crypto-assets and will refer to the responsibilities and obligations of crypto-asset service providers. In October 2022, the Financial Stability Board (FSB) – an international organisation for cooperation among financial authorities – published a proposed framework for the international regulation of crypto-asset activities[28]. This work is not expected to be finalised until mid-2023. Expectations regarding the regulatory framework are high, as it is hoped it will lay down a minimum set of consistent international rules for the crypto-asset markets. The details of the regulatory framework will also still have to be separately transposed into national law.

In the European Union, crypto-asset markets are governed by the Markets in Crypto Assets Regulation (MiCA). The Regulation was adopted by the European Parliament and the Council of the European Union in spring 2023, and it will enter into force soon.[29] The first of the MiCA provisions will apply 12 months after the Regulation's entry into force; the remainder will apply after 18 months. This long-awaited MiCA Regulation will lay the foundation for regulating markets in crypto-assets and rooting out misconduct. The Regulation will also harmonise Member States' national legislation on the crypto-asset sector. There are, however, many areas related to the crypto-asset markets and DeFi that MiCA does not cover, and to address these specificities and risks, crypto-asset market regulation must be developed further.[30]

The MiCA Regulation covers issuers of unsecured crypto-assets and stablecoins, as well as crypto-asset trading platforms and wallets for storing crypto-assets.[31] MiCA will impose obligations on crypto-asset issuers and trading platforms concerning, in particular, their liquidity management and the provision of an information document ('white paper') for investors on the products offered. The Regulation also requires crypto-asset service providers to meet the requirements set under the Digital Operational Resilience Act (DORA). MiCA distinguishes between three different types of crypto-assets: asset-referenced tokens (ARTs),[32] e-money tokens (EMTs)[33] and other

crypto-assets. With the MiCA Regulation, issuers of significant stablecoins will be brought under the direct supervision of the European Banking Authority (EBA). However, for other crypto-asset market participants, authorisations will still be issued by national competent authorities (NCAs). NCAs shall report to the European Securities and Markets Authority (ESMA) on major crypto-asset service providers operating in their jurisdiction.

In many cases, the regulation of crypto-asset markets has proven challenging due to their structural differences compared with the rest of the financial system, and in particular the issue of identifying the relevant entities operating in ecosystems that are ostensibly or extensively decentralised. For some existing crypto-assets, it is difficult to determine the actual issuer. One example of a crypto-asset without an identified issuer is Bitcoin, which falls outside the scope of the MiCA Regulation. Authorities have sought to address the need for regulation of the crypto-asset markets step by step. MiCA is the EU's first regulatory framework concerning crypto-asset markets and is not all-encompassing: no provisions are included on crypto-asset conglomerates[34], crypto-asset lending or other decentralised finance services; the regulation of these aspects of crypto-asset markets is something for the future.

Before the introduction of MiCA, EU-level regulation of crypto-asset markets was mainly in the context of preventing money laundering and terrorist financing. The anonymity linked to crypto-assets is believed to have increased their criminal use for money laundering purposes, which contributed to the need to adopt the 5th Anti-Money Laundering Directive (5AMLD) in the EU. The Directive required Member States to extend their AML legislation to cover crypto-assets and related services by transposing at least the minimum level set by the Directive into national regulations by early 2020. In Finland, AML legislation was extended to cover providers of virtual currencies by virtue of the Act on Virtual Currency Providers, which entered into force in May 2019.[35]

Efforts have therefore been made to harmonise the AML framework for crypto-assets at EU level. However, need for further harmonisation has been identified as Member States' national legislation has left gaps in the framework and because interpretations of the Anti-Money Laundering Directive vary depending on the jurisdiction.[36] In addition to the 6th AML Directive, upcoming changes to the AML framework, including implementation of the Financial Action Task Force (FATF) 'Travel Rule', will in part be implemented directly in the Member States in conformance with applicable regulations. This could potentially widen the coverage and sharpen the focus of the regulatory framework in the crypto-asset markets as well.

Furthermore, technology issues related to crypto-asset markets are being addressed in the EU Regulation on a pilot regime for market infrastructures based on distributed ledger technology

(DLTR).[37] Most of the regime entered into force in March 2023 and is applied to DLT settlement systems (DLT SS), DLT multilateral trading facilities (DLT MTF) and DLT trading and settlement systems (DLT TSS) that apply certain limitations regarding the financial instruments that can be traded and settled. As the DLTR will remain in force until March 2026, it is only a temporary provision, in contrast to the MiCA and the AML package.

The pilot regime is open to new market entrants who can apply for authorisation under the Central Securities Depository Regulation (CSDR) or MiFID II at the same time as applying for specific DLTR permission.[38] One of the key objectives of the DLTR is to allow technological innovation and experimentation in a regulatory environment that also minimises potential risks to financial stability.

In Europe, attention has been focused on developing specific EU-level regulation for crypto-asset market participants and crypto-assets that have previously been outside the scope of existing regulation. In the United States, regulation and supervision are focused to the financial market supervisory authorities, in particular the Securities and Exchange Commission (SEC) and the Community Futures Trading Commission (CFTC), which have typically defined crypto-assets as either securities or commodities under existing legislation.

In conclusion

So far, instability in crypto-asset markets has had very little effect on the global financial markets. The most tangible effects have been the losses suffered by hedge funds and private investors with investments in the crypto-asset markets. Furthermore, a widespread fall in the value of crypto-assets has affected the valuations of companies that have invested directly in crypto-assets or carried out business related to maintaining blockchains. In some instances, problems in the crypto-asset markets may have caused reputational damage to companies and banks with ties to these cases. Rapid changes in the crypto-asset sector have made it difficult to detect linkages between crypto-asset markets and the financial system in advance, as demonstrated by the linkages to Silvergate Bank's bank deposits in the Silvergate events.

The strong market fluctuations in recent years were not the first bubble in the crypto-asset sector, and it would be unwise to assume they were the last. Many of the risks now seen in crypto-asset markets are familiar from the global financial markets of recent decades (loss of confidence and deposit runs), where the materialisation of risks led to increased market regulation. Therefore, the pending regulatory reforms concerning the crypto-asset sector represent the anticipated response to the need to prevent the type of risks and misconduct seen in the crypto-asset markets.

Besides focusing on the current business models in crypto-asset markets, more consideration should also be given to the new technologies that they utilise. Distributed ledger technology or, in particular, the technical solutions in permissionless platforms that it facilitates, could potentially be used in a permissioned environment as well. Trials in numerous Big Tech companies, banks and the public sector[39] show that there is interest towards the use of new technologies in both permissionless and permissioned networks. Time will tell whether distributed ledger technology could offer benefits without permissionless decentralisation.

It seems that activity which involves significant monetary value – and therefore is of consequence to financial stability – has a tendency to centralise and gravitate towards regulation. This may be especially so in Europe as MiCA enters into force, as many crypto-asset market entities see a competitive advantage in the trust and confidence brought by regulation. In a less likely scenario, even large financial sector operators may begin to incorporate blockchain technology into their services. In these speculative scenarios, the choice between a permissionless or a permissioned platform is particularly important. And while individual crypto-asset service providers may be operating in accordance with MiCA, their collective effect could potentially strengthen the links between the global financial system and permissionless blockchains such as Ethereum. Should this happen, the governance and technical risks of the use of permissionless DLTs could also pose threats to financial stability. Therefore, technological knowledge of permissionless DLTs should be improved and issues relating to blockchain maintainers should be taken into account in the regulatory debate in advance, before problems arise. In this respect, the Regulation on the pilot regime for market infrastructures based on distributed ledger technology (DLTR) is a step in the right direction.

Notes

1. Distributed ledger technology (DLT) refers to technology that supports the recording of encrypted data at multiple locations. (MiCA). ↑
2. Decentralised finance (DeFi) is defined as financial services, such as trading, borrowing, lending and investing, provided on distributed ledger technology and used without relying on a centralised financial intermediary. (BIS Working Papers, 17 January 2023). ↑
3. Crypto-asset service provider (CASP) means a participant whose business is the provision of crypto-asset services, such as the custody and administration of crypto-assets on behalf of third parties, the exchange of crypto-assets for other crypto-assets or for fiat currency that is legal tender, or the operation of a trading platform for crypto-assets. (MiCA). ↑
4. A blockchain is a form of distributed ledger in which details of transactions are held in the ledger in the form of blocks of information. A block of new information is attached to the chain of pre-existing blocks via a computerised process by which transactions are validated. (FSB 11 October 2022). ↑

5. Crypto-asset means a digital representation of value or rights which may be transferred and stored electronically, using distributed ledger technology or similar technology. (MiCA). ↑
6. Crypto-assets' total market capitalisation is obtained by adding up the market value of each crypto-asset, i.e. the volume of crypto-assets issued multiplied by their price. Total market capitalisation, as a crypto-asset metric, is somewhat misleading as it does not take into account the weak liquidity of crypto-asset markets and the lack of barriers to the creation of new crypto-assets. The charts are based on market data available from public sources. The data should be treated with caution due to the larger than normal deficiencies in the availability and quality of data. The crypto-asset sector does not yet have well-established statistical standards. In addition, the data reported by crypto-asset service providers to the authorities are not as comprehensive as most of the supervisory and statistical data reported by entities in the global financial system. ↑
7. Institutional Investor Digital Assets Study. (Fidelity, September 2021). ↑
8. DeFi services include deposits in lending services, staking and assets tied to automated trading liquidity. The total value of assets locked into the DeFi protocols is obtained by adding up the volume of crypto-assets in the services multiplied by their prices. (DefiLlama). ↑
9. Terra's peg to the US dollar was maintained with an arbitrage mechanism, in which Luna was sold and bought against Terra. The supply of Luna was dynamic, so that when Terra was bought (sold), Luna was removed from (added to) circulation. In a bull market, a decrease in the supply of Luna pushed up its price, whereas in a bear market, an increase in supply pushed down its price. (Terra Docs). ↑
10. Lessons from the crypto winter - DeFi versus CeFi. (OECD, 14 December 2022). ↑
11. News article on FTX's assets (Coindesk, 2 November 2022) ↑
12. Well-run banks don't fail – why governance is an enduring theme in banking crises (Keynote speech by Andrea Enria (ECB) 1 June 2023) ↑
13. 'The tightening of financing conditions increases the risks to the global financial system' (Euro & talous, 27 April 2023) (in Finnish) ↑
14. Banking in the shadow of Bitcoin? The institutional adoption of cryptocurrencies. (BIS Working Papers, 18 May 2022). ↑
15. More information on Silvergate Bank (FT, 10 December 2022). Investment in the crypto-asset sector, especially through the Silvergate Exchange Network (Silvergate, 6 October 2020) and through the purchase of the technology of Facebook's Diem stablecoin (Silvergate, 31 October 2022). ↑
16. United States authorities took control of Signature Bank. (FDIC press release, 12 March 2023.) ↑
17. New York State Department of Financial Services: Internal review of the supervision and closure of Signature Bank (NYDFS, 28 April 2023). ↑
18. Signature Bank Faced Criminal Probe Ahead of Firm's Collapse (Bloomberg, 15 March 2023). ↑
19. Testimony on bank oversight, Vice Chair for Supervision Michael S. Barr. (Federal Reserve, 28 March 2023). ↑

20. Decrypting financial stability risks in crypto-asset markets (ECB Financial Stability Review, May 2022). ↑
21. Crypto-assets and decentralised finance: Systemic implications and policy options (ESRB, May 2022). ↑
22. Are Blockchains Decentralized? (Trail of Bits, 21 June 2022). ↑
23. Cryptocurrencies and Decentralized Finance (BIS Working Papers, 24 April 2022). ↑
24. The history of Ethereum (ethereum.org, 19 May 2023). ↑
25. Oracles store information on the blockchain about events outside the blockchain, such as data on prices in centralised markets. ↑
26. EU financial services chief calls on US to create new crypto rules (FT, 18 October 2022). ↑
27. ECB to warn eurozone countries over crypto regulation (FT, 4 July 2022). ↑
28. FSB proposes framework for the international regulation of crypto-asset activities (FSB, press release 11 October 2022). ↑
29. The Regulation will enter into force on the 20th day following its publication in the Official Journal of the European Union. ↑
30. Mind the gap: we need better oversight of crypto activities (ECB, The Supervision Blog, 5 April 2023). ↑
31. Digital finance: Council adopts new rules on markets in crypto-assets (MiCA) (Council of the European Union press release 30 June 2022) ↑
32. An asset-referenced token (ART) is a type of crypto-asset that aims to maintain a stable value by referencing to the value of several official currencies used as legal tender, one or more commodities, one or more crypto-assets or a combination thereof. ↑
33. An e-money token (EMT) is a type of crypto-asset that is primarily intended for use as a means of exchange and that aims to maintain a stable value by referencing to the value of only one official currency used as legal tender. ↑
34. The term 'crypto-asset conglomerate' refers to entities and groups providing several crypto-asset-related activities on a single platform, such as exchange, custody, lending, deposit gathering, settlement and clearing and market-making. (FSB, 11 October 2022). ↑
35. EU 2018/843; in section 2, subsection 1, paragraph 2 of the Act on Virtual Currency Providers, 'virtual currency provider' refers to issuers of virtual currency, virtual currency exchange services and their marketplaces and wallet service providers. ↑
36. Proposal for an AML Directive of the European Parliament and of the Council (2021/0250 COD) ↑
37. The DLT Regulation of the European Parliament and of the Council. (2022/858/EU 30.5.2022). ↑
38. Directive 2014/65/EU of the European Parliament and of the Council (2014/65/EU 15.5.2014) on MiFIDII and Regulation on CSDs (909/2014/EU 23.7.2014) ↑
39. European Blockchain Services Infrastructure (EBSI) ↑

The opinions expressed in this article are those of the authors and do not necessarily represent the views of the Bank of Finland.

Keywords

blockchain, concentration risk, crypto-assets, financial stability, regulation