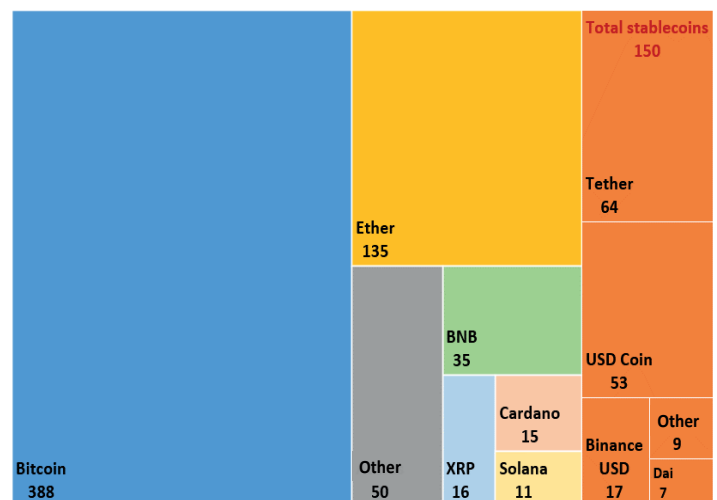


The Crypto Boom: Challenges and Risks

Grégoire De Warren

- Crypto-assets are commonly defined as any digital asset based on blockchain technology. These assets have grown tremendously over the last few years and now refer to a diverse asset class with multifarious functions and challenges. Aside from crypto-assets built on well-established blockchains, such as Bitcoin and Ether, there are many tokens – issued through applications that are decentralised to a varying degree – that contribute to the crypto ecosystem's growth. Stablecoins, a type of crypto-asset whose value is pegged to one or more assets (which is supposed to ensure a stable value) have also experienced significant growth and play a pivotal role in the crypto sector by providing a bridge to traditional finance.
- Although crypto-assets have not been widely used as a means of payment, the asset class can offer yield and diversification to those who can endure large bouts of price volatility. Crypto-assets are also used as vehicles for transferring funds, particularly across borders. A substantial financial ecosystem has taken shape, one that has attracted institutional and retail investors alike. Crypto-assets are also at the heart of the “decentralised finance” movement, whose advocates claim would reduce the friction in transactions that results from intermediation.
- Having said that, crypto-assets face persistent headwinds – slow and expensive transactions, energy consumption and security threats – that make it difficult for the market to gain traction, as reflected by the sharp contractions observed since May 2021. Crypto-asset markets also have several vulnerabilities, including a high degree of concentration, liquidity risks, and exposure to market risk. These weaknesses create challenges for financial stability, even though the market capitalisation of crypto-assets, which contracted threefold since November 2021, remains modest compared to other asset classes (about \$800bn in June 2022 versus approximately \$25tn for the New York Stock Exchange and \$11tn for gold).
- Effective regulation of crypto-assets is crucial for the sector and related technologies to grow, while protecting investors, ensuring financial stability, and combating money laundering and terrorist financing. Efforts are underway in the form of the PACTE Act in France, the Markets in Crypto-Assets regulation (MiCA) which is being finalised in Europe, and a number of prudential regulations.

Crypto-asset market capitalisation, June 2022 (\$bn)
Total market capitalisation: \$800bn



Source: CoinMarketCap (21 June 2022).

1. The crypto-asset market is evolving at a rapid pace¹

1.1 The user base, number and types of crypto-assets have grown exponentially since 2020

Crypto-assets are digital assets that use cryptographic algorithms and distributed ledger technology (in the form of a blockchain) to confirm and record their existence.² They comprise a multitude of assets with increasingly diverse (and, for some, complex) functions, each with different purposes and challenges. Over 16,000 crypto-assets were in circulation at the start of the year, and about 300 are created each month.³ The crypto-asset landscape is seeing an increasing number of participants. About 200 million people owned crypto-assets at the end of 2021 (80 million of which held Bitcoin), nearly twice as many compared to early 2020.

Crypto-assets fall into three main categories, the borderlines between them sometimes being unclear.

First, there are cryptocurrencies, which are digital tokens issued directly by the blockchain protocol on which they run. Originally designed as a decentralised medium of exchange, where trading could occur without banking intermediation or regulatory oversight, cryptocurrencies primarily serve as a liquidity instrument within the crypto-asset ecosystem. Each of these crypto-assets – some of the most well-known being Bitcoin (BTC), Ether (ETH), Litecoin (LTC), Cardano (ADA), Monero (XMR), Solana (SOL), and Ripple (XRP) – is issued according to its underlying protocol and has a specific function (see box 1).

The second category of crypto-assets are tokens. Tokens are digital assets which are built on top of an existing blockchain (most notably the Ethereum blockchain)⁴ and are usually issued by an application.

Box 1: What determines the value of Bitcoin or ether?

For the most part, crypto-assets are not based on any underlying physical asset (such as commodities or real estate) or economic asset (such as the share of a company's equity), but on a protocol based on which they are issued. Crypto-assets do not generate revenue streams, which are traditionally used to estimate the value of a financial asset (the stream of dividends for stocks, the coupon and principal for bonds). In addition, unlike gold, silver or artwork, which have industrial, cultural, aesthetic and medical use cases that give them intrinsic value, crypto-assets cannot be valued based on fundamentals. Their price action is therefore inherently volatile.

- On the supply side, the number of crypto-assets available on the market depends on the supply schedule encoded in the underlying protocol, or on the issuing application. For example, the supply schedule of Bitcoin, which is set to decrease geometrically over time, has created about 19 million bitcoins since it came into existence in 2009. The supply of bitcoin is fixed at 21 million, which is scheduled to be reached in 2140. In reality, however, only a small percentage of these bitcoins are in circulation (around 20%) and the ensuing low level of liquidity in the market contributes to the significant price volatility.^a Ether, however, will be issued in perpetuity (its circulating supply is currently about 120 million). Other protocols, as well as some platforms that issue crypto-assets, are programmed to gradually destroy a portion of their crypto-assets in order to limit supply and act as price support. This is the case for Binance Coin (BNB), for example.
- On the demand side, the appeal of a crypto-asset will depend on: (i) investor confidence in future price appreciation, (ii) its potential use as a transactional instrument (particularly for Bitcoin),^b (iii) its liquidity, (iv) its utility as an asset enabling portfolio diversification, (v) its potential use cases, and (vi) the relevance of the underlying blockchain and, more generally, distributed ledger technology.

a. According to Chainalysis, most of the bitcoin supply (85%) was illiquid at the end of 2021 as it was either controlled by investors who are bullish on bitcoin and prefer to hold it over the long term, or permanently lost (lost access keys, forgotten passwords, etc.).

b. Bitcoin is apparently used as a means of payment (as opposed to investment) for over 7% of the transactions on the Bitcoin network. This figure is much higher in China, Russia, and countries that face restrictions on cross-border capital flows: Graf von Luckner, Reinhart and Rogoff (2021), "Decrypting New Age International Capital Flows", *NBER*.

(1) These findings are based on data available as of June 2022.

(2) Distributed Ledger Technology (DLT) is a technology that enables the decentralised and secure storage of information (such as transactions and contracts) using cryptography. Blockchain is a particular type of DLT where transactions are packaged together into "blocks" and each new block is chained to the previous one using software algorithms to validate transactions.

(3) Financial Stability Review, ECB (2022), "Decrypting financial stability risks in crypto-asset markets".

(4) The Ethereum network combines blockchain technology with smart contract functionality to develop new applications with varying degrees of decentralisation (dApps). Use cases are diverse, ranging from social network platforms, to gaming, digital financial services, ecommerce, and more.

There are many different types of tokens. All have different properties and functions that are defined by self-executing digital contracts (“smart” contracts) stored on a blockchain, which automatically execute certain actions when predetermined conditions are met.⁵ Most tokens are used to settle transactions and exchange fees within an application (the Uni token, for example, allows to settle transactions within the Uniswap application) or decentralised finance protocol (such as the Maker token of the MakerDAO protocol), enabling the growth and development of the application or protocol. The tokens are generally issued when investors stake, or lend, their crypto-asset holdings in an application (yield farming). Tokens are then transferred on exchange platforms.

Within the universe of tokens, there are two types worth mentioning:

- Utility tokens grant its holders a number of benefits, often in the form of access to products

and services (ownership interest, access to benefits, access to communities of users, governance action such as voting on changes to an application’s protocol, etc.). Non-fungible tokens (NFTs) are the most well-known type of utility tokens (see box 2).

- Security tokens represent and act like traditional financial securities (such as stocks, bonds, debt, ownership interests) on a blockchain. Smart contracts therefore have all of the necessary information on the issuer, financing product, legal documentation, ownership interests, trading conditions for the security, payment of dividends or interest, etc. Security tokens are merely a simple technical evolution of traditional investments.

The third and last category are stablecoins. These are tokens whose value is backed by other assets (asset-referenced tokens) or a currency (e-money tokens).⁶ Price stability can be achieved in different

Box 2: Non-fungible tokens (NFTs)

A non-fungible token is a type of utility token that exists on a blockchain and represents a digital file (e.g. pictures, video, music) associated with a non-fungible asset, meaning that it has unique properties such as a serial number, name, or video game character attributes. NFTs are therefore always: a) unique because they are indivisible and non-replicable, and b) tamper-proof because they are easily traceable on the blockchain. These tokens have many use cases and give a glimpse into new markets, particularly in areas such as: (i) culture, through the issuance and exchange of digital objects on the blockchain, (ii) luxury goods, by acting as a certificate of authenticity, and (iii) video games, through the representation of objects and characters in the gaming world. In France, many start-ups specialising in NFTs have emerged, raising significant amounts of funds. Examples include Sorare (fantasy football), The Sandbox (video game in the 3D metaverse), and Arianee (protocol allowing to preserve the scarcity of any luxury or fashion good by associating it to an NFT).

The NFT space is fuelled by celebrity TV shows, professional sports teams, and companies in the fashion and consumer goods industries. These stakeholders use NFTs to communicate with fans/customers and drive engagement in exchange for rewards (governance action, related products, event tickets, etc.). Over the longer term, NFTs have a wide range of meaningful use cases. They could be used in virtual worlds to raise funds, ensure authenticity and guarantee ownership. There is also the potential for monetisation and greater interaction with the real world.

However, questions still remain on ensuring ownership rights of NFTs. Indeed, reproduction rights such as intellectual property rights on the underlying digital file are highly inconsistent and still in flux. Moreover, although NFT ownership is guaranteed in the digital world because the token is stored on a blockchain, nothing stops someone in the real world from creating and selling an NFT that represents artwork. As the NFT market contracted in 2022 to about \$3 billion, following exponential growth in 2021, it will be essential for the market’s future growth and stability to adapt legislation through relevant case law on intellectual property, particularly as it relates to the interaction between ownership rights in real assets and ownership rights in digital assets.

(5) In the case of Ethereum, these conditions are governed by the Ethereum Request for Comments (ERC), a set of rules (common to a single token and defined by users) for developing new functionalities on the Ethereum blockchain. The most well-established token standard is ERC-20 whose procedures to create and exchange tokens are precisely defined.

(6) Some stablecoins are not actually backed by reserve assets. Instead, they use smart contracts to automatically adjust the available supply based on demand, thereby maintaining a stable value (e.g. Basis Share).

ways: (i) by establishing a reserve of a physical asset like fiat currency, which ensures the peg (as done for the two main stablecoins, Tether [USDT] and USD Coin [USDC], which are backed by the dollar), (ii) through decentralised mechanisms where the collateral consists of other crypto-assets and smart contracts are used to maintain the peg (such as for the Dai stablecoin by MakerDAO which is pegged to the dollar in this fashion), or (iii) through algorithmic token supply modulation, where arbitrage opportunities allow for the creation or destruction (“burn”) of the available supply, which automatically stabilises its price (such as for Neutrino USD [USDN]). Stablecoins play a pivotal role in the crypto sector, as they facilitate a large number of transactions in the ecosystem (about 75% of transactions involve a stablecoin) and provide a bridge to traditional currencies.

1.2 The crypto-asset market is subject to dramatic ebbs and flows

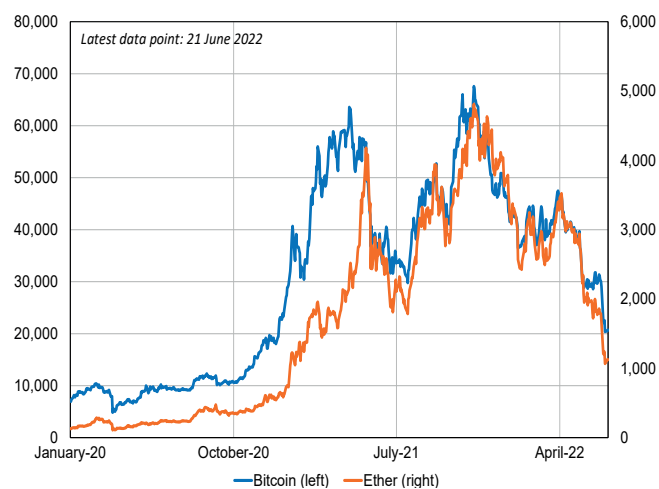
Total market capitalisation for the crypto-asset market, which has grown significantly over the last few years, had experienced several sharp contractions since May 2021. Following a first all-time high of \$700bn at the start of 2018,⁷ which was entirely driven by growth in Bitcoin, the market soared once again in the later stages of 2020, peaking at nearly \$3tn in market capitalisation in November 2021. The surge benefited from favourable macroeconomic conditions. It was initially driven by loose monetary policies that increased the supply of liquidity and encouraged the search for yield, and then by an accumulation of savings across Europe and the United States during the pandemic. This led to the arrival of new retail

investors, almost exclusively exposed to Bitcoin, gradually followed by more sophisticated institutional investors that were highly diversified in crypto-assets and held positions in more complex derivative products.

However, the crypto-asset market has experienced three significant pullbacks in the span of twelve months (in May 2021, from November 2021 to January 2022, and since April 2022). Today, Bitcoin is hovering around \$20,000, which is lower than in early 2021 due primarily to concerns about stricter regulatory frameworks (including the crackdown on mining activity as well as investments and payments using crypto-assets in China in May 2021, then in Russia in January 2022) and to tighter monetary policies that had an impact across all financial markets (see chart 1). Other concerns relating to financial stability, money laundering and terrorist financing risks, as well as the energy consumption of crypto-assets, have also hindered their growth. The downturn is exacerbated by the market’s high volatility, which itself is aggravated by the system’s low liquidity (average daily trading volumes are about \$46bn and \$32bn for Bitcoin and Ether respectively). Total market capitalisation was about \$800bn in June 2022, a far cry from the \$3tn it nearly reached in November 2021.

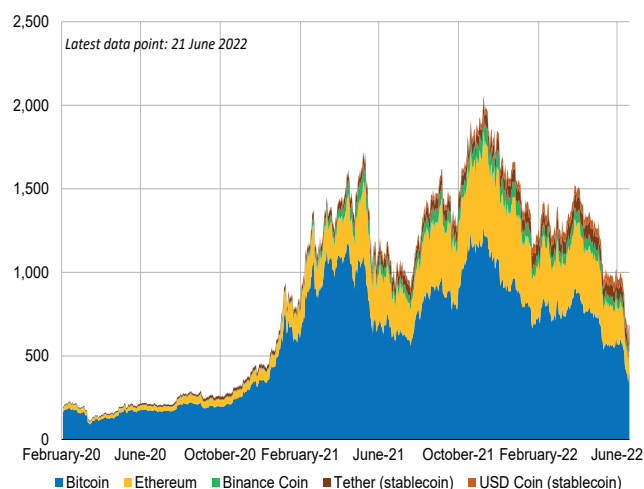
In terms of composition, Bitcoin’s share of the crypto-asset market shrank from 70% in early 2021 to just approximately 45% in June 2022, with Ether and stablecoins accounting for just under 20% and roughly 15% respectively (see chart 2). The prices of the major crypto-assets remain very highly correlated to each other (stable correlation of 0.8 between Ether and Bitcoin), which lessens the argument for diversification and explains, inter alia, why investors are still predominantly focused on Bitcoin.

Chart 1: Price of Bitcoin and Ether (\$)



Source: Reuters.

Chart 2: Market capitalisation of main crypto-assets (\$bn)



Source: Bloomberg.

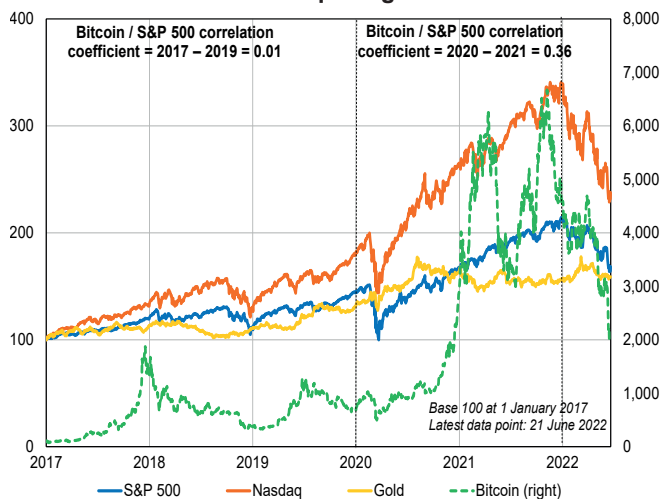
(7) The data on the number of crypto-assets in circulation and their market values were provided by cryptocurrency data aggregators such as CoinMarketCap and CoinGecko.

1.3 Use cases for crypto-assets are growing although they are still rarely used for payments

Crypto-assets, including Bitcoin, are still not widely used as a method of payment, even though they were initially designed for that purpose. Today, most of the major payment platforms (Visa, Mastercard, Google Pay, etc.) support cryptocurrency payments, and several companies, such as Uber, have announced that they may accept cryptocurrency payments in the future. However, because companies still have to contend with high crypto-asset price volatility and a lack of liquidity, meaningful use cases are few and far between when compared with the totality of payment flows around the world. In addition, most payments made in cryptocurrency still rely on an underlying transaction executed in fiat currency before being converted into a crypto-asset by exchange platforms. In the case of PayPal, for example, customers are able to pay using cryptocurrencies, but merchants will receive dollars after conversion by partnering with crypto-asset exchange platforms (in this case, Coinbase).

However, crypto-assets are widely used by traditional investors as speculative assets that have the potential to generate high returns.⁸ In addition to the potential yield, crypto-assets have historically been used as a way to diversify investment portfolios. The “crypto community” has long considered Bitcoin a safe haven that provides a hedge against inflation and a collapse in the stock market, even though inflows, market depth, and liquidity remain very weak compared to traditional safe investments like gold and US Treasuries. In reality, from 2017 to 2019, the price of Bitcoin was mostly influenced by idiosyncratic factors that were weakly correlated with traditional market indices. Since 2020, however, the correlation between crypto-assets and equity markets increased significantly, driven by the expansion and normalisation of loose monetary policies. The correlation coefficient between Bitcoin and major market indices has considerably increased, reaching 0.3 for the S&P 500 and 0.4 for the Europe Stoxx 600.⁹ The correlation of Bitcoin and the Nasdaq was particularly evident when the market turned at the end of 2021 and since April 2022 (see chart 3).

Chart 3: Price of Bitcoin against the S&P 500, Nasdaq and gold



Source: Reuters.

Although there has not been much quantitative analysis on changes in crypto-asset holdings by major financial sector players, a number of qualitative studies show that they have increased their global exposure to crypto-assets, particularly investment funds, pension funds, hedge funds, family offices, and portfolio managers.¹⁰ Most of the major financial institutions (Goldman Sachs, Morgan Stanley, BlackRock, etc.) have had to launch specialised cryptocurrency desks under growing demand from their clients. Some non-financial companies, such as MicroStrategy and Tesla, also decided to start holding crypto-assets on their balance sheets. Such corporate decisions have a major impact on market sentiment towards those assets.

The institutionalisation of these investments was made possible by the growth in a number of related financial products and vehicles. Several exchange-traded funds (ETFs) that specialise in crypto-assets were launched in 2021. Total assets of crypto ETFs quickly scaled to about \$15bn, even though this is still modest compared to the global market for ETFs. Several passive investments were also developed, first in the United States and then Europe, in the form of exchange-traded products (ETPs), which are directly indexed to crypto-asset prices.

Along the same lines, an important class of derivative instruments using cryptocurrencies as the underlying

(8) Major crypto-assets delivered much higher returns versus other asset classes over the last several years (Bitcoin, for example, achieved a return of 57% in 2021 versus 27% for both the S&P 500 and the Nasdaq). Of course, these returns were accompanied by high volatility and exposure to risk.

(9) Adrian, Iyer and Qureshi (2022), “Crypto Prices Move More in Sync With Stocks, Posing New Risks”, *IMF*.

(10) The data on crypto-asset adoption in the financial sector derive from the 2022 report by the OECD Committee on Financial Markets entitled “The institutionalisation of crypto-assets and the potential for growing interconnectedness between decentralised and traditional finance”.

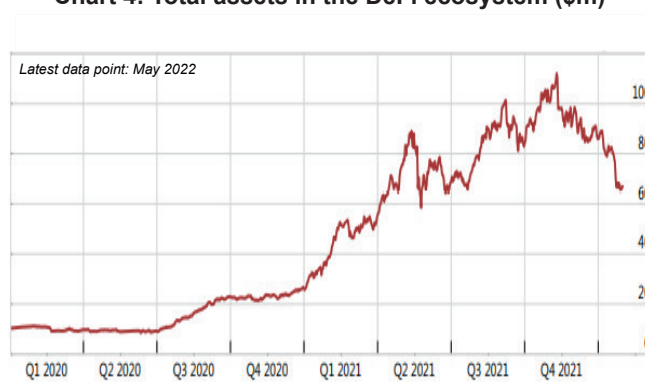
asset have emerged (options, forward contracts, contracts for difference, interest rate and currency swaps, etc.). Today, Bitcoin derivatives traded on regulated platforms like the Chicago Mercantile Exchange represent 14% of total open interest and 4% of trading volume, in spite of the fact that most crypto-asset transactions take place on unregulated platforms. In November 2021, the open interest in Bitcoin derivatives markets, which corresponds to the total amount invested in outstanding derivative contracts, reached about \$12bn.

Several events have illustrated possible use cases for crypto-assets, particularly in countries facing financial difficulties. Ever since Russia invaded Ukraine, crypto-assets have been used to hedge against inflation, circumvent difficulties in accessing cash when limits are imposed on bank account withdrawals, and raise funds and facilitate international transactions in the face of slow cross-border payments and risks of bans on capital outflows. Bitcoin was adopted as legal tender by El Salvador in 2021, and the Central African Republic recently followed suit. Both countries adopted Bitcoin for different reasons (to reduce the economy's reliance on the USD, and to free itself from the CFA franc, respectively) but the experiment has yielded poor results for the time being.¹¹

Crypto-assets are at the heart of decentralised finance, or DeFi,¹² which enables alternative financing

performed on an autonomous and decentralised basis, without any financial intermediaries, trusted third parties or supervision, using a smart contract deployed on a blockchain.¹³ These different innovative services make it possible to automate lending, exchanges, investments, insurance, and cryptocurrency payments. Crypto-assets also serve as collateral in DeFi applications, which is essential to process transactions and provide liquidity to the system. DeFi has many potential benefits including efficiency gains, instantaneous transactions, lack of supervision, speed of execution, lower transaction costs related to intermediation, and traceability. This has led to an increase in crypto-asset transactions outside of the traditional financial system (see chart 4).

Chart 4: Total assets in the DeFi ecosystem (\$m)



Source: DeFi Pulse.

2. Growth in crypto-assets remains constrained by technical limitations and significant risks

2.1 Crypto-assets expose investors to high financial and individual risks

The crypto-asset ecosystem is highly unstable and poorly regulated. Fraud and market manipulation are estimated to have amounted to \$14bn in 2021.¹⁴ Within DeFi alone, studies show that around \$2.5bn was lost in 2021 due to hacking and protocol manipulations to exploit flaws. The leading NFT marketplace, (OpenSea) also announced in January 2022 that

over 80% of NFTs created using OpenSea's free minting tool were either plagiarized or fake. Individual risks related to cyberattacks (phishing, identity theft, ransomware, etc.) are also of concern. It is estimated that each successful cyberattack generates a median loss equal to 30% of the victim's deposits.¹⁵

The financial risks are also considerable, particularly for retail investors with limited knowledge and understanding of the ecosystem's complexity, given

(11) Six months after bitcoin was adopted in El Salvador, only 20% of businesses (mainly large companies) accept the cryptocurrency as a means of payment and just 5% of sales in the country are made in bitcoin – disappointing figures considering the considerable cost incurred by the State to implement the program (\$30 subsidy per user to incentivise downloading the app for performing transactions in bitcoin).

(12) See OECD (2022), "Why Decentralised Finance (DeFi) Matters and the Policy Implications".

(13) More broadly speaking, some crypto-assets are intimately tied to the concept of Web 3.0, the next generation of the internet with an infrastructure that encourages the decentralisation of internet applications and all data would be connected on a decentralised basis, using blockchain technology.

(14) Chainalysis (2022), "Crypto Crime Trends for 2022".

(15) IMF (2022), "Global Financial Stability Report".

the ease of access to interfaces used.¹⁶ The amount of risk is further amplified by factors including: (i) high use of leverage, (ii) riskier profiles across the ecosystem, (iii) lack of transparency concerning most crypto exchanges, (iv) the insatiable search for yield, and (v) the “gamification” of finance (which only serves to further whet the appetite of retail investors for these complex assets). Fraud and financial risk of this kind are encouraged by the lack of audit and supervision in the sector and the absence of recourse for investors who suffered damages.

2.2 Crypto-assets face technical limitations

The earliest blockchains face a range of limitations related to crypto-asset mining. To validate transactions and issue new tokens on the major blockchains (such as Bitcoin, Ethereum, and Litecoin), a consensus algorithm called Proof of Work is used where computers must solve a complex mathematical problem. These blockchains are experiencing increasing network congestion due to a significant rise in transactions (from 400,000 in early 2020 to over 1.2 million at the end of 2021 on Ethereum for example). Network congestion has several drawbacks.

Firstly, transaction fees – which compensate the miners who validate transactions – can be very expensive. In tandem with the increase in transaction flows, transaction fees have also significantly increased, reaching a high of \$60 per transaction on the Ethereum network at the end of 2021, which rendered smaller transactions unprofitable. Transaction fees also apply to data storage, which can be just as costly. Since the start of 2022, transaction fees have fallen by a considerable amount, to about \$5 per transaction in May, owing to the decline in the price of Ether, the advent of alternative blockchains, and softening demand for NFTs.

Secondly, it can take a long time for transactions to go through. Transactions are slowed down by network congestion and can take several minutes to process (the Ethereum blockchain validates only about 15 transactions per second on average). This puts a spoke in the wheel of crypto’s future prospects and reduces the likelihood that the ecosystem will replace traditional finance.

Lastly, the process of validating blocks of transactions consumes copious amounts of electricity. The Bitcoin network’s annual energy consumption has been

growing at a rapid pace since early 2021. By some estimates, Bitcoin mining now consumes the same amount of electricity (200 TWh) every year as Thailand. Although the energy consumption of a network does not exactly equate to its environmental footprint (which depends on the energy mix used for mining, which varies by country), several officials, such as the vice-chair of the European Securities and Markets Authority, have recommended a ban on blockchains that use Proof of Work consensus protocols.

These limitations dampen the crypto-asset ecosystem’s ambitions, in particular DeFi, whose benefits have not yet materialised given that it still greatly underperforms traditional finance in terms of security, scalability, speed of execution, and transaction fees. This is illustrated by the fact that most transactions in the DeFi space (the volume of which seems to be stagnating since the end of 2021) are executed in isolation and that touchpoints with the traditional finance ecosystem are scarce.

Several other blockchains, however, are putting forward avenues for significant improvement by changing the validation mechanism, even if they do not provide the necessary guarantees in terms of security. The main alternative to the Proof of Work consensus mechanism is Proof of Stake, which requires that miners stake their own tokens in order to validate new blocks of transactions. Proof of Stake has already been adopted by several blockchains including Cardano and Tezos, and Ethereum is expected to switch to Proof of Stake in its new version by the end of 2022. This consensus mechanism reduces transaction fees, consumes far less energy than Proof of Work, and offers new functionalities that are promising for the future prospects of crypto-assets. The energy consumption per transaction on Cardano is said to equal 0.5 kWh (the same as two Google searches) versus 62 kWh on Ethereum and 707 kWh on Bitcoin. Other blockchains use different types of consensus protocols (Tron and Cosmos use “Delegated Proof of Stake”, Solana uses “Proof of History”, BNB uses “Proof of Authority”, etc.) or complement existing blockchains, which enhances the potential for growth. At this stage, however, these blockchain networks do not display the same level of security as Bitcoin, whose capabilities are boosted even further by second layer protocols (in particular the Lightning Network which enables the creation of additional payment channels, thereby partly solving Bitcoin’s scalability problem).

(16) The financial risks of crypto-assets are described in “Assessment of Risks to Financial Stability from Crypto-assets”, Financial Stability Board, (2022).

2.3 The growth in crypto-assets entails risks for financial stability

There are several financial risks that come with crypto-assets, including concentration risk, liquidity risk, and market risk.

The crypto-asset market is especially concentrated among a few actors that have a significant influence on price action. About 10,000 wallets, or 0.01% of holders, collectively own more than 25% of all bitcoins in circulation. In addition, the market is built around a few platforms (Binance, Coinbase, FTX, Kraken, etc.). If just one of them were to default, due for example to a cyberattack exploiting weaknesses in its infrastructure, the entire sector could be destabilised. The issue of regulating these platforms, which oversee the issuance, custody, and exchange of assets, is also problematic for those located in jurisdictions with preferential tax regimes.

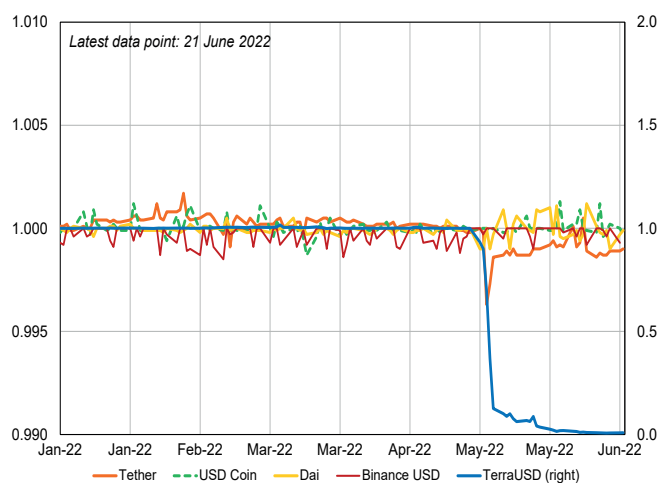
The liquidity of crypto-assets can fluctuate wildly, and in 2021 alone, thousands of them saw their value collapse, and in some cases even vanish entirely. In addition, various platforms and applications are extremely vulnerable to liquidity shortages and runs on deposits.¹⁷ For example, when cryptocurrency prices collapsed recently, crypto lender Celsius (nearly 2m users and around \$25bn in assets under management [AUM] at the end of 2021) faced massive withdrawals (about half of its AUM in only a few months) and had to freeze its remaining assets in June 2022 due to a high risk of insolvency. The risk is even greater given that liquidity is generally only supplied by a few players. Over half of the deposits on major platforms come from a few individual accounts, which makes them highly vulnerable to sudden movements and creates a risk for the entire ecosystem due to the lack of transparency around liquidity management.

Crypto-asset volatility coupled with their very high correlation can create difficulties for some investors and portfolio managers. For instance, many speculative crypto funds have struggled to maintain adequate levels of liquidity and capital since the market plummeted in April 2022, such as the Singapore-based hedge fund Three Arrows Capital (3AC). Besides the impact on portfolio valuations, a decline in crypto-asset prices can also affect the DeFi market. When crypto-asset prices fall, so does the value of

the collateral deposited in DeFi applications. This will result in positions being liquidated when investors are not able to restore the requisite level of collateral. Liquidations across DeFi platforms, which have a one-year probability of 24% according to the IMF, have been occurring with increased frequency over the last few months due to the correction in prices (Aave, Maker, and Compound had already suffered liquidations worth about \$300m on their platforms in November 2021). For platform users, this does not only mean losses but also higher transaction fees.

Lastly, stablecoins have risks of their own.¹⁸ When the algorithmic stablecoin TerraUSD (UST) lost its peg in May 2022 and subsequently collapsed in value, it was a reminder of the enduring fragility of such an asset whose peg, ensured in a decentralised way, is particularly vulnerable to a massive exodus of investors. Beyond algorithmic stablecoins, risks also exist for major stablecoins that maintain their peg using reserve assets (such as USDT and USDC). Stablecoin issuers attempt to reassure investors on issues such as the composition and liquidity of their reserves, the entity that is legally responsible, and liquidation procedures, but these assurances still seem largely insufficient. Concerns about the governance, risk management, and operational resilience of stablecoins were exacerbated when Tether (USDT) temporarily dipped below its peg on 12 May 2022 (shortly after the collapse of TerraUSD), after several legal actions were initiated against Tether surrounding false claims the company made about its reserves (see chart 5).

Chart 5: Historical price action of major stablecoins (\$)



Source: Bloomberg.

(17) Crypto exchange and lending platforms do not enjoy the same protections as banking deposits do today, such as deposit insurance and central bank liquidity support. As a result, because of the liquidity and maturity transformation that these platforms provide, they are exposed to risks of massive withdrawals by investors who face a shortage of liquidity or lose confidence in the level of reserves, like monetary funds for example (which are subject to specific regulations for this reason).

(18) See FSB (2021), "Regulation, Supervision and Oversight of Global Stablecoin Arrangements".

There are significant risks associated with stablecoins, not only for the crypto-asset ecosystem given the vital role that they play (USDT, or Tether, is involved in 50% of crypto-asset transactions), but also for the entire financial industry. Indeed, to maintain parity, reserve assets are heavily invested in traditional financial markets, and particularly in short-term money market securities (Treasury bills, commercial paper, certificates of deposit, cash instruments). As

a result, credit markets could suffer consequences if the value of stablecoins were to collapse due to significant redemption requests and fire sales caused by a loss of investor confidence.¹⁹ Stablecoins are also a threat to monetary sovereignty as they essentially create alternative units of account to replace traditional fiat currencies and a money supply that central banks cannot control, which could impede the effective implementation of monetary policy.

3. The crypto-asset ecosystem must be regulated to be sustainable

3.1 The ecosystem's tug of war between regulation and decentralisation

To regulate crypto-assets may seem paradoxical given the original, deeply libertarian principles that various players in the ecosystem continually promote. Regulation is paramount, however, in light of concerns surrounding money laundering, financial stability, and consumer protection.

Proper supervision is a significant challenge given the sector's opacity. The number and complexity of possible transactions and the use of specific technologies to enhance privacy,²⁰ or sometimes to circumvent the law, make it difficult for regulators to trace transactions, in turn increasing the risk of illicit activities and evasion of sanctions.

Centralised crypto exchange platforms are therefore necessary to ensure the supervision of crypto-asset transactions, which is only possible when users transition between traditional sovereign currencies and crypto-assets (also known as “on- and off-ramps”), which they almost only do on these platforms. Some of these platforms have already announced new supervisory measures, particularly for anti-money laundering and combating the financing of terrorism (AML/CFT), although these measures appear to have varying levels of effectiveness from platform to platform.²¹ It is therefore vital to enhance the regulatory framework to protect investors and ensure market integrity while containing financial stability risks.

Ongoing discussions at the European and international level have focused on two possibilities: (i) address crypto-asset risks using existing standards applied to

traditional financial intermediaries, or (ii) adapt existing standards to reflect the sector's specific features. From this standpoint, DeFi constitutes a major challenge as any extension to existing frameworks would likely have little relevance, or not apply at all, given the absence of an entity that can be held responsible for the protocol. Today, there are not yet many crypto-assets that possess entirely decentralised structures, and it is usually possible to identify the centralised parties (for example the creators, owners or operators of applications as opposed to protocols) that exert enough influence to become subject to specific regulations. In addition, the risks related to DeFi are not yet deemed to be sufficiently important to justify changing the standards that apply to these financing structures. However, other paths to regulation could be considered someday based on DeFi's future growth and adoption.

3.2 Challenges and outlook for the regulatory framework in France and Europe

To date, regulation of the crypto-asset sector has primarily focused on money laundering and terrorist financing risks, by applying the standards developed by the Financial Action Task Force (FATF) to crypto-assets. These measures, which have been implemented in France and Europe, consist of making all service providers subject to compliance and transparency obligations and establishing Know Your Customer (KYC) processes to better ascertain the identity of those engaging in crypto-asset transactions.

Beyond risks related to money laundering and terrorist financing, France's PACTE Act created a new category of legal entity, Digital Asset Service Provider (DASP), which is registered with the Financial

(19) See Sang Rae Kim (2022), “How the Cryptocurrency Market is Connected to the Financial Market”.

(20) For example, Monero (XMR) is a crypto-asset based on a blockchain that ensures the total anonymity of its users given that its transactions cannot be tracked or traced.

(21) Out of the 16 largest crypto exchange platforms, only 4 (itBit, eToroX, LMAX Digital and Currency.com) were found to be in compliance with market regulations in March 2021, according to Walker and Mosioma (2021), “Regulated Cryptocurrency Exchanges: Sign of a Maturing Market or Oxymoron”, *London School of Economics*.

Markets Authority (AMF) with assent of the Prudential Supervisory and Resolution Authority (ACPR). This will make it possible to regulate the distribution of digital assets, better protect investors (through enhanced transparency and supervision of these activities), and educate users on underlying mechanisms.

The draft on Markets in Crypto-Assets (MiCA) regulation also aims to regulate the issuance of crypto-assets by requiring that crypto-asset service providers maintain a license and registered office in the EU and that they be supervised by European authorities. The draft regulation also includes specific rules for stablecoins, which are identified as the weakest link in the ecosystem. Stablecoins would be required to create a transparent reserve in an amount equivalent to the value of outstanding stablecoin; stablecoin holders would be offered a

direct legal claim by the issuer; and there would be rules on managing the reserve's liquidity.

In addition, prudential authorities are tasked with limiting the crypto-asset exposure taken on by traditional financial market entities. For example, the Basel Committee on Banking Supervision (BCBS) recently issued a consultation paper²² on the prudential treatment of banks' crypto-asset exposures. This is expected to lead to a set of minimum standards that national regulators can implement in the banking system. Lastly, work is currently underway, particularly within the framework of the Financial Stability Board, to fine-tune the mapping of crypto-assets and related risks for financial stability, and to promote better coordination among international regulators, a prerequisite to ensure a level playing field that limits the risk of tax avoidance.

(22) Basel Committee on Banking Supervision (2021), «Prudential treatment of cryptoasset exposures», *BIS*.

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