EFRAG

European Financial Reporting Advisory Group

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Issues Paper- Key developments in the crypto-market

Objective

1   The purpose of this paper is to present to the EFRAG TEG the key developments in the crypto market since the July 2020 issuance of the Discussion Paper on Accounting for Crypto Assets (Liabilities) (the DP).

2   The paper consists of the following sections:

(a)   Highlights of key developments

(b)   Aggregate data/trends on crypto-market developments

(c)   Key developments on Decentralised Finance (DeFi), Non-fungible tokens (NFTs)

(d)   Overview of crypto-related risks

(e)   Developments on crypto-issuer and service provider regulation

(f)   Potential implications for accounting of recent crypto-market innovations

(g)   Appendix 1 – Updated Glossary of terms

(h)   Appendix 2 – References

Highlights of key developments

3   The key trends and recent developments can be summarised as follows:

(a)   The crypto market capitalisation has increased from USD 192 billion (December 2019) to USD 2.56 trillion (October 2021).

(b)   This increase in market capitalisation is attributable to a significant increase in Decentralised Finance (DeFi) and Non-Fungible Tokens (NFTs), an increase in micropayment tokens and stablecoins.

(c)   The market capitalisation of stablecoins has quadrupled in 2021 to more than USD 120 billion (Figure 2). Tether (USDT) remains the largest stablecoin. It is backed by the USD and is managed by a company acting as a central institution, although its market share has declined as major centralised crypto exchanges have introduced their own versions.

(d)   There has been a slowdown in Initial Coin Offerings (ICOs), Initial Security Offerings (ISOs) and Initial Exchange Offerings (IEOs) including Security Exchange Offerings (SEOs) since late 2019. However, following the rapid growth of decentralised finance (DeFi), decentralised platforms/exchanges (DEXs) have become a new way to raise funds with the issuance of Initial Decentralised Offerings (IDOs). Examples of popular DEXs include Uniswap

and Pancakeswap. As of early December 2021, there are 131 DEXs that are listed with Coinmarketcap.

(e) The various jurisdictions take different approaches for the crypto-assets regulations ranging from the crypto-friendly regulation of Switzerland, Canada, Japan, Singapore and Australia to the ban of cryptocurrency exchanges and mining operations in China. In between this range exists for example the cautious UK approach and the fragmented approach between the federal and state levels of the US.

(f) The MiCA regulation of the EC creates a unified framework for crypto-assets which will have little impact on for example France's and Germany's regulations since these jurisdictions had already an established framework similar to MiCA.

Aggregate trends/data on crypto-market developments

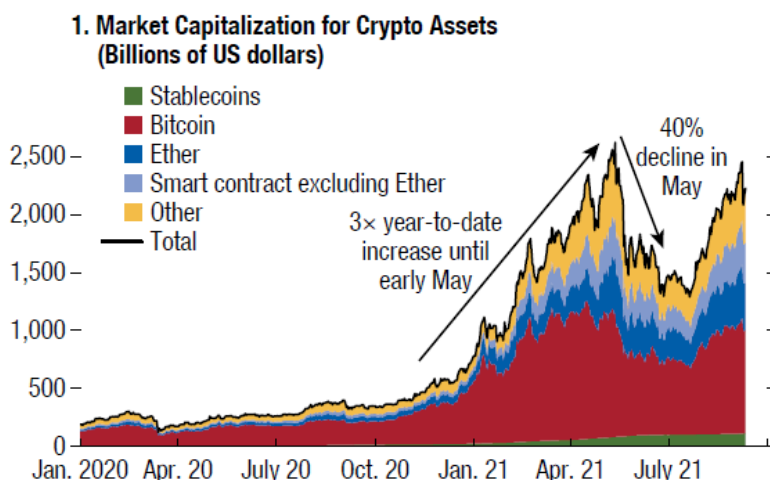*Developments in market capitalisation and cryptos in circulation*

4 The DP (Chapter 1, paragraph 1.16) highlighted that as at the end of December 2019, there were approximately 5,000 different crypto-assets were traded or listed on various crypto-asset exchanges with a total market capitalisation of USD 192 billion, mainly dominated by a few crypto-assets that also primarily serve as cryptocurrencies or payment tokens (i.e. BTC which has 68.28% overall market capitalisation and the top 3 cryptocurrencies (BTC, ETH and XRP) have 80.07% of overall market capitalisation).

5 The October 2021 International Monetary Fund (IMF) Global Financial Stability Report (herein referred to as the IMF report) shows that the crypto market capitalisation has grown significantly in the last two years. Through early May 2021, it almost tripled in value in 2021 to an all-time high of USD 2.5 trillion (Figure 1.1). The approximately thirteen-fold increase in the crypto market capitalisation from USD 192 billion (the end of December) to USD 2.56 trillion attributes itself to a significant increase in utility tokens mainly in DeFi and Non-Fungible Tokens (NFTs), an increase in tokens intended for smaller payments with transactions that are faster and less expensive in gas fees compared to Bitcoin and Ethereum and increase in stablecoins.

6 At the time of writing[1], there are approximately 13,000 crypto assets, over 400 recognised exchanges, with a market capitalisation of USD 2.46 trillion[2]. The main categories of crypto assets are utility tokens (which include infrastructure, networks with an increased focus on DeFi products), cryptocurrencies (including payment tokens) and security tokens.

7 Furthermore, in the last two years, there has been a notable shift from Bitcoin's dominance in terms of market capitalisation from approximately 70% (December 2019) to less than 45% (September 2021). The noted trends have resulted from market interest for newer blockchains that use smart contracts to solve the challenges of earlier blockchains by introducing features to ensure scalability, interoperability, and sustainability of the crypto ecosystem. These newer infrastructure blockchains are often energy-efficient compared to Bitcoin (as they use a Proof-of-Stake consensus mechanism) and offer developers more opportunities than Bitcoin. Some of the emergent blockchains (such as Solana) compete not only with Bitcoin (which is mainly used as a cryptocurrency) but also with the Ethereum blockchain.

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[1] 27 October 2021

[2] Coinmarketcap (https://coinmarketcap.com/)

Figure 1- Crypto ecosystem market developments

The market value of the ecosystem increased dramatically in 2021 and expanded beyond Bitcoin.

1. Market Capitalization for Crypto Assets (Billions of US dollars)

- Stablecoins
- Bitcoin
- Ether
- Smart contract excluding Ether
- Other
- Total

40% decline in May

3× year-to-date increase until early May

Source: IFM Global Financial Stability Report October 2021

8   The evolution in newer blockchains has also resulted in the tremendous growth in DeFi and NFTs (discussed below). Amongst the newer blockchains, one that has grown significantly in the past two years is Solana (market capitalisation of approximately USD 70 billion as of October 2021). Solona is designed to compete with Ethereum (market capitalisation of approximately USD 550 billion as of October 2021), serving both as a cryptocurrency and a platform for running crypto applications, but being much faster than Ethereum. Furthermore, the past two years have seen a significant shift from proof-of-work (PoW) to proof-of-stake (PoS) crypto assets. In October 2021, an article from Blockwords[3] reports that the market capitalisation for the top 30 PoS crypto assets had reached USD 594 billion representing a fairly significant share of the total crypto market capitalisation.

*Stablecoins (including aggregate adoption, breakdown of reserve assets)*

9   Stablecoins aim to reduce the volatility of virtual currencies like Bitcoin and Ethereum by tying the value of cryptocurrencies to other more stable assets. However, the main aim of stablecoins is to be widely used as a currency for daily transactions in the future.

10   There are two broad categories of stablecoins:

(a)   Collateralised" (or "backed") cryptocurrencies which are tied to an external value (whether it be a fiat currency, another cryptocurrency, or assets), which, in theory, provides stability; and

(b)   "Non-collateralised" or non-backed, meaning they are not linked to any external value, rather they exclusively use algorithms to avoid price fluctuations. In these models, it is the blockchain itself that controls currency volatility by using algorithms and smart contracts.

11   According to the IMF report, the market capitalisation of stablecoins has quadrupled in 2021 to more than USD 120 billion (Figure 2). Tether (USDT) remains the largest stablecoin. It is backed by the USD and is managed by a company acting as a central institution. Tether is one of the greatest success cases: was built in 2014 on

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[3] Blockworks.co

open blockchain technology, it currently[4] stands at a value close to USD 70 billion and a 24hour volume of just over USD 103 billion. The company claims that it has sufficient dollars "in reserve" that act as a deposit guarantee for the platform's customers.

Figure 2 – Stablecoin market capitalisation

The market cap of stablecoins has quadrupled in 2021 while Tether's dominance has declined.
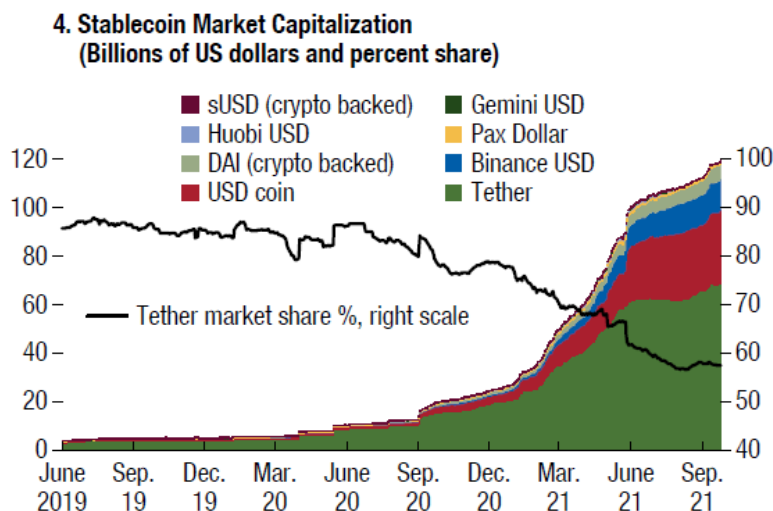
Source: IFM Global Financial Stability Report October 2021

12   Despite the success of Tether, its market share has declined sharply over the last two years as major centralised crypto exchanges have introduced their own versions (for example, USD Coin by Coinbase and Binance USD by Binance). According to the IMF report, stablecoin trading volumes outpace those of all other crypto assets (Figure 3).

Figure 3 – Daily trading volumes on exchanges

Trading volumes of stablecoins, Ether, and other smart contracts rose rapidly in 2021.
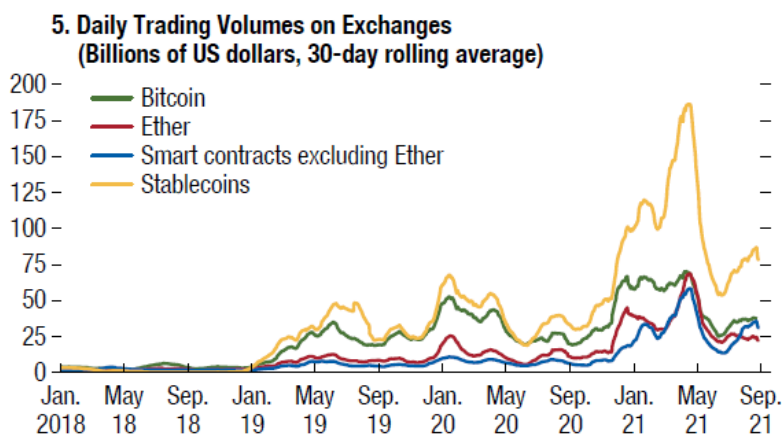
Source: IFM Global Financial Stability Report October 2021

ICOs, SEOs, IEOs and similar offerings (IDOs)

13   During the height of the 2017 bullish crypto market, a wave of high-risk ICOs hit the market (i.e., around 80% were found to be either scams or they failed), and the need

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[4] Coinmarketcap 27 October 2021

for more secure crowdfunding platforms became apparent. This was discussed in detail in the DP.

14   Since the end of 2019, ICOs have become less popular as a means of fundraising. This has been partly due to regulatory oversight, with several ICOs being regarded as securities (as thus regulated under the applicable regulation), others deemed to fraudulent and others simply failing and this resulted in significant losses to unprotected investors.

15   IEOs were initially a success, but the centralised nature of such launches (which involves an intermediary making the decisions) has proven to be a drawback, with many considering this was against the intended decentralisation ethos of the crypto-founders.

DEXs and the start of IDO's

16   Following the rapid growth of the DeFi ecosystem (discussed below), DEX platforms (decentralised platforms) have become a central platform to raise funds through IDOs and provide an alternative to the centralised predecessors.

17   IDOs are token issuances that take place on decentralised exchange platforms[5] rather than centralized fundraising or cryptocurrency exchange platforms. The earliest and most prominent DEXs were built on the Ethereum blockchain, but alternatives are growing in popularity on blockchains like Binance Smart Chain (BSC), Solana, and Polkadot. Through an IDO, a crypto project can launch its token's public debut on a DEX, attracting interest from retail investors.

18   The lessening popularity of ICOs is also evident in the graph below from CryptoActu. Except for some outliers, the amounts raised from ICOs are steadily decreasing.
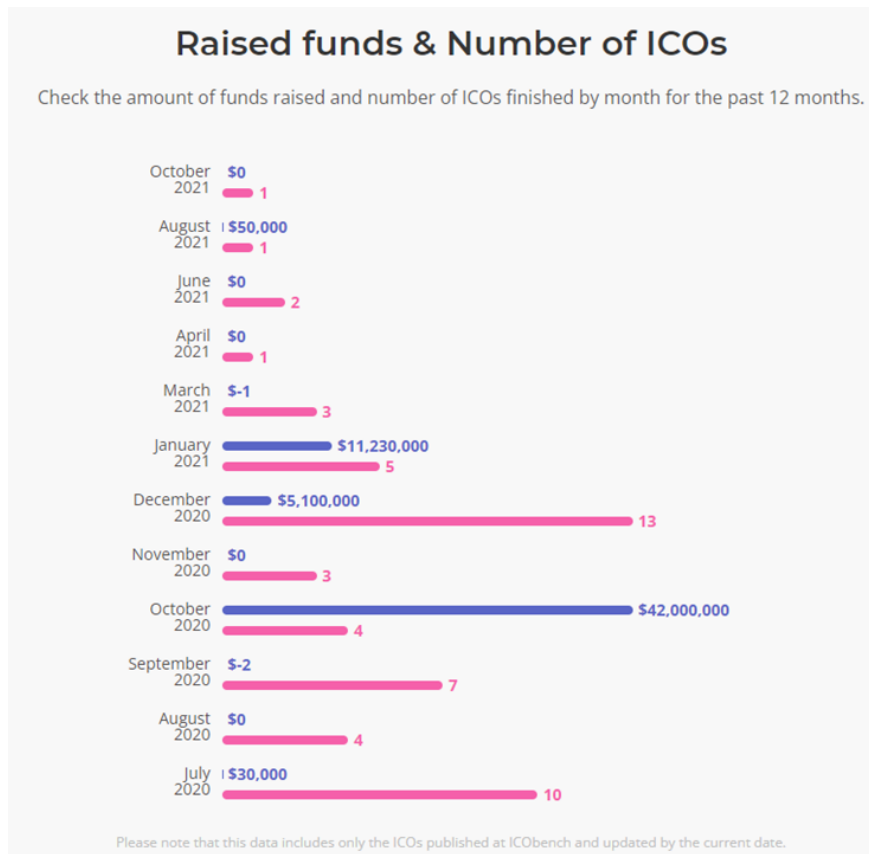
Figure 4 – ICOs in the world
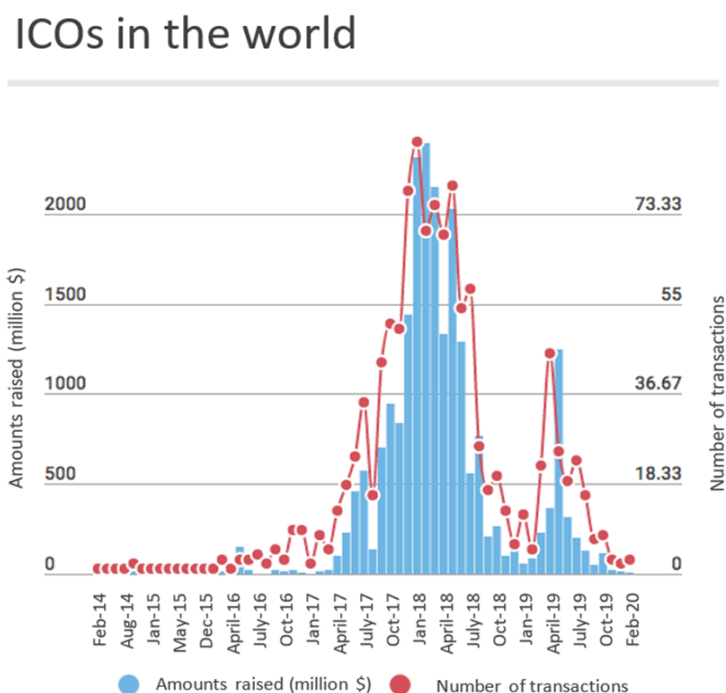
Source: Coindesk and Smith & Crown

19   The graph below shows the number of ICOs, and funds raised from July 2020 to October 2021 published at ICObench. This is just the statistic of one ICO rating platform, but if the data provided is considered, an upwards trend is further noticed.

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[5] Like Uniswap, SushiSwap, and PancakeSwap

Figure 5 – Raised funds & Number of ICOs

Raised funds & Number of ICOs

Check the amount of funds raised and number of ICOs finished by month for the past 12 months.

Month	Funds Raised	Number of ICOs
October 2021	$0	1
August 2021	$50,000	1
June 2021	$0	2
April 2021	$0	1
March 2021	$-1	3
January 2021	$11,230,000	5
December 2020	$5,100,000	13
November 2020	$0	3
October 2020	$42,000,000	4
September 2020	$-2	7
August 2020	$0	4
July 2020	$30,000	10

Please note that this data includes only the ICOs published at ICObench and updated by the current date.

Source: ICObench

CBDCs (including aggregate adoption, ECB uptake, China CBDC experience)

CBDC's aggregate adoption

20 The October 2021 McKinsey & Company report "CBDC and Stablecoins: Early coexistence on an uncertain road*"* (herein referred to as the McKinsey report) informs of the rapid rise in the circulation of stablecoins over the past couple of years has resulted in central banks stepping up their efforts to explore their own stable digital currencies (known as central bank digital currencies or CBDCs).

21 While CBDCs will be issued under the supervision of central banks, stablecoins are potentially subject to regulatory oversight from multiple agencies, depending on their classification as assets, securities, or even money-market funds. This is causing concern to central banks and regulatory bodies across the world.

22 The McKinsey report also notes that central banks see CBDC's as being more than a digital-native version of traditional currency and envision that CBDC's could be used as vehicles for monetary and social policy that could restrict their use to basic necessities, specific locations, or defined periods of time.

ECB Uptake

23 The McKinsey report noted that the European Central Bank (ECB) announced recently it was progressing its 'digital euro' project into a more detailed investigation phase. More than four-fifths of the world's central banks are similarly engaged in

pilots or other central banks' digital currency (CBDC) activities. The report explains that the ECB approach involves licenced financial institutions each operating a permissioned-node of the blockchain network as a conduit for the distribution of a digital euro. The idea under consideration is to issue fiat currency as anonymous fungible tokens (digital cash) to protect the privacy of the user.

China CBDC pilot experience

24   According to the McKinsey report, the most advanced market application of CBDC so far has been the People's Bank of China's (PboC) multicity pilot of its digital version of the Chinese Yuan called eCNY – electronic Chinese National Yuan.

25   China started this project in 2019, and by June 2021 the pilot test included over 20 million personal wallets, more than 3.5 million merchant wallets, and an aggregate output of more than RMB 34 billion (USD 5.2 billion). Some key objectives and features of the eCNY are:

(a)   The initial focus is to replace cash for payments within the transportation, shopping, and government services sectors.

(b)   A bank account will not be necessary for consumer users of eCNY unless a user wants to withdraw funds from a digital wallet.

(c)   eCNY will carry the same legal status as cash and will be distributed by the PboC to six authorised state-owned banks, who will circulate it to consumers who will be able to download via a wallet from these banks without holding a bank account with them.

(d)   Potential benefits of using eCNY include mitigated KYC risk and reduced compliance costs related to monitoring and reporting.

Key developments on DeFI, NFTs

Definitions including the distinction of Decentralised Finance (DeFI) from Centralised Finance (CeFi)

DeFi

26   Decentralised Finance known as DeFi, uses cryptocurrency and blockchain technology to manage financial transactions. DeFi aims to change the way traditional finance works and democratise finance by replacing legacy, centralised institutions with peer-to-peer relationships that can provide a full spectrum of financial services, from everyday banking, loans, and mortgages, to complicated contractual relationships and asset trading.

27   DeFi works with smart contracts[6] that can automatically execute an action when a certain event occurs. For example, an insurance claim can be automatically validated, and the payout will be made in a single transaction, creating a faster and potentially more effective way of processing insurance claims.

28   Most DeFi applications today are built using the Ethereum network, but many alternative public networks are emerging that deliver superior speed, scalability, security, and lower costs.

Differences between DeFi and CeFi

29   The main differences between DeFi and CeFi are[7]:

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[6] Smart contracts are automated enforceable agreements that do not need intermediaries to execute and can be accessed by anyone with an internet connection.

[7] October 2021 PwC report Defi: *Defining the future of finance* (herein referred to as PwC report)

(a) Autonomy – DeFi applications (Dapps) don't have restricted access and the transactions are not managed by a third party or central authority. Everything is done via a smart contract, with little to no human intervention.

(b) Availability – Dapps can be accessed from anywhere in the world, as long there is an internet connection.

(c) Transparency – Most of the time the code of the Dapp is publicly available for anyone to consult or audit. This generally means that anyone can examine the smart contract, and if they find bugs they can report them. All transactions done through Dapps are publicly available on the blockchain – however, the parties engaging in the transactions are pseudo-anonymous on most blockchains.

(d) Disintermediation – Anyone can build an application on top of smart contracts for DeFi or interact directly with smart contracts from their crypto wallets without having to go through a third-party intermediary.

(e) Interoperability – Dapps can be run on several blockchains and applications can build or interlinked by combining other DeFi applications. Currently, there are several DeFi crypto assets that are working on interoperability features.

Brief description of evolution from smart contract platforms (Ethereum, DeFI tokens)

30   DeFi has experienced significant growth since mid-2020. Per the IMF report, the size of Defi grew from USD 15 billion at the end of 2020 to around USD 110 billion as of September 2021 (Figure 4) largely due to:

(a) Decentralised exchanges that allow users to trade crypto assets without an intermediary; and

(b) Credit platforms that match borrowers and lenders without the need for a credit risk evaluation of the customer. These services operate directly on the blockchain and usually without the need for customer identification and other KYC requirements.

**Figure 6 – Total value locked in Defi**
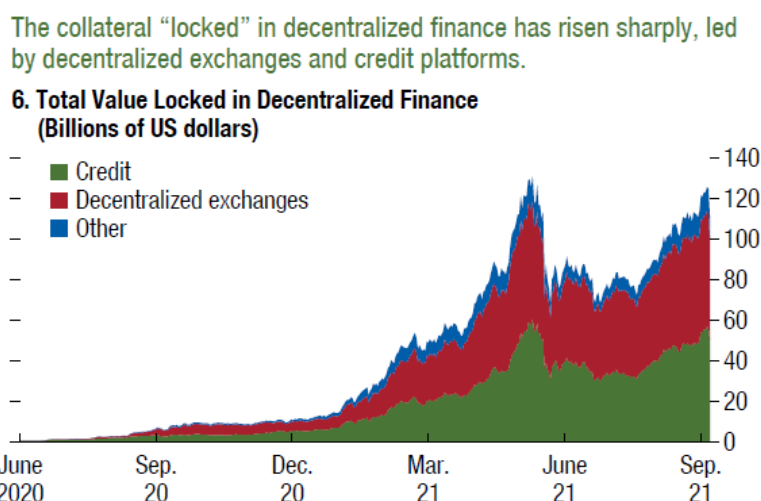
Source: IMF Global Financial Stability Report October 2021

Non-fungible tokens (NFTs)

31   Wikipedia describes a non-fungible token (NFT) as a unique and non-interchangeable unit of data stored on a digital ledger. NFTs can be used to represent easily-reproducible items such as photos, videos, audio, and other types of digital files as unique items, and use blockchain technology to establish a verified and public proof of ownership.

32   As of today, the world's most expensive NFT artwork is still Beeple's Everydays: The First 5,000 Days: a collage consisting of 5,000 images measuring 21,069 x 21,069 pixels and bought at Christie's for over USD 69.3 million. The image could be copied, but the blockchain establishes the true ownership (provenance) and any associated rights.

33   A November 2021 PwC publication-Non-Fungible Tokens- Legal, tax and accounting considerations you need to know indicates that the weekly volumes of NFTs have increased from USD 13.7 million in weekly volumes sales in the first half of 2020 to USD 2.5 billion in the first half of 2021. The chart below indicates the trend in weekly volumes sales of art and collectibles NFTs.

Figure 7 – Weekly Trading Volumes of NFTs by category ($m)
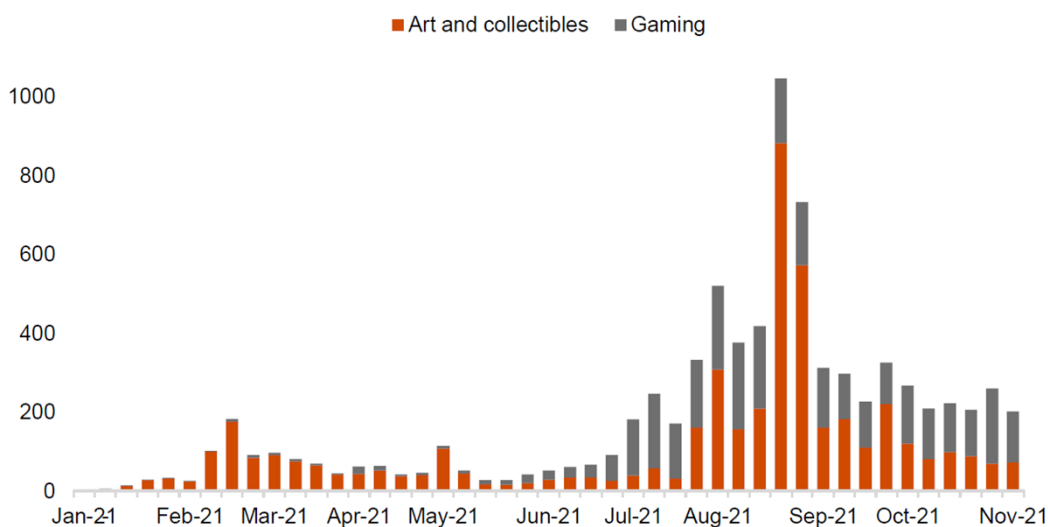
Source: The Block Research, Nov 2021 cited in aforementioned PwC publication

34   Another view of trends is provided by the October 2021 Economist article "NFTs are not just for digital art – and their popularity is growing", which depicts a graph of the trading volumes of NFTs in 2021 differentiating between NFTs in general and art NFTs. Trading volumes for art NFTs have fallen from their peak of about USD 200m in March 2021 to less than USD 25m in July 2021 whereas trading volumes of NFTs overall have remained steady.

Figure 8 – Trading volumes of NFTs
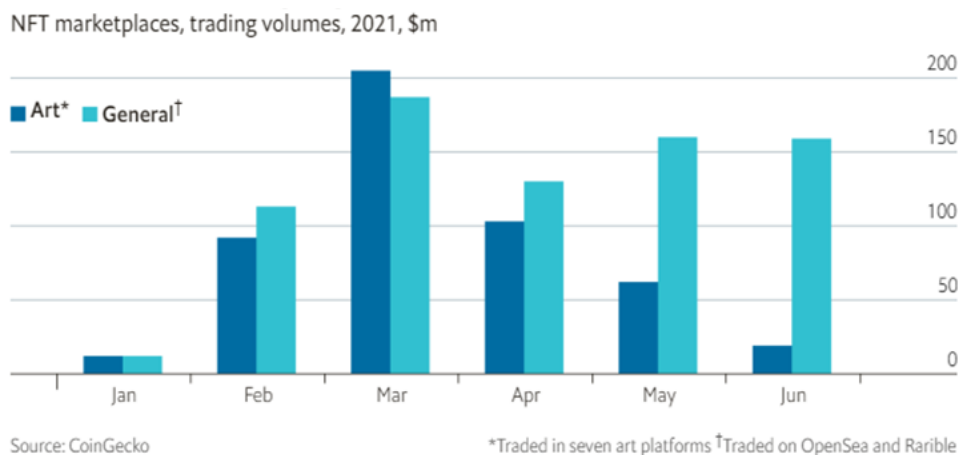
35 The total value of NFTs issued on the Ethereum blockchain is USD14.3 bn, according to DappRadar, a blockchain research company. Companies that create NFTs, which were introduced in the 2010s, can be now valued as high as an established, long-standing company. Still, as we see in the chart, there are signs that the market is cooling off for digital art.

36 Even though art trading has slumped, more uses for the tokens are coming up. For example, San Marino has approved the use of NFTs to issue digital covid vaccine passports. Another kind of NFT is virtual land NFT which confers the right to build properties in different virtual words known as "metaverses". Furthermore, NFTs are evolving with artificial intelligence (AI) and smart contracts being added to the code.

37 Still, there are heightened risks in this segment that need to be fully understood before NFTs can achieve true adoption.[8]

Views on potential growth and institutional uptake/investment

38 A recent article by Forbes Advisor titled "Decentralized Finance Is Building A New Financial System" (April 2021) notes that DeFi is an emerging phenomenon that comes with many risks. As a recent innovation, decentralised finance has not been stress tested by long or widespread use. In addition, national authorities are taking a harder look at the systems it's putting in place, with an eye toward regulation. Some of the key risks are:

(a) DeFi has thrived in the absence of rules and regulations and offers no customer protection.

(b) DeFi potential use cases rely on software systems that are vulnerable to hackers.

(c) Nearly all DeFi lending transactions require collateral equal to at least 100% of the value of the loan, if not more. These requirements vastly restrict who is eligible for many types of DeFi loans.

(d) Newly issued DeFi tokens are highly volatile.

39 DeFi also carries big implications for the big data sector as it matures to enable new ways to commodify data.

40 Furthermore, some investments funds like Grayscale are investing in more mature DeFi crypto assets.

Overview of related risks

41 The Bank of America report summarises (as shown in the below Figure) some of the key risks (i.e., technology/adoption and legal/regulation risks) associated with the different products in the crypto-ecosystem.

Figure 9 – Risks for digital assets and application

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[8] October 2021 Bank of America report: Digital Assets Primer: First Innings (herein referred to as the Bank of America report)

Exhibit 4: Risks for digital assets and applications
Key risks that could slow the adoption of blockchain technology

Technology	Technology/Adoption Risk	Legal/Regulation Risk
Cryptocurrencies/Tokens	**Energy consumption** Risk of potential adopters avoiding coins/tokens because of their perceived environmental impact **Too big, too fast** Risk that grand ideas to transform or remake industries don't pan out, causing potential adopters to cast doubt on the digital asset ecosystem	**Environmental risk** Risk of regulatory action to reduce the environmental impact of PoW mining **Regulatory risk** Risk of the SEC implementing onerous regulations or preventing the formation of crypto ETFs **Governmental risk** Risk of countries banning crypto trading (China and India already have in some capacity)
Non-Fungible Tokens (NFTs)	**Awareness** Risk that investors may have limited understanding of what they're purchasing or may be buying into the hype phase, causing current and potential adopters to avoid in the future **Underlying tech** Risk that software bugs cause smart contracts to fail, leading to lack of confidence in the underlying technology	**Legal risk** NFTs and legal frameworks that involve assets other than images, such as physical assets or the IP for digital art/collectibles, are still developing
Decentralized Finance (DeFi)	**Consumer protection** Risk that hacks, fraud and rug pulls (developers abandoning failing projects) involving current adopters with limited recourse will cause both current and potential adopters to revert to traditional financial institutions	**Regulatory risk** Risk of greater disclosure, AML/KYC and reserve requirements creating headwinds for DeFi companies or forcing an industry intended to be decentralized into a more centralized form
Stablecoins	**Disclosure** Risk that limited disclosure requirements about reserves could lead current and potential adopters of stablecoins to avoid them **Too big to fail** Risk that stablecoins pegged to fiat currencies could fail, creating a liquidity shock and leading current and potential adopters to cast doubt on the stability of the digital asset ecosystem	**Regulatory risk** Risk of impending regulations requiring 1:1 currency reserves, reducing the usefulness of stablecoins, or imposing a ban due to the perceived risk of losing monetary policy control
Central Bank Digital Currencies (CBDCs)	**Privacy** Risk that potential adopters perceive the loss of privacy as a reason to avoid **Underlying tech** Risk that underlying blockchain technology will not scale effectively	**Regulatory risk** Risks that issuance is delayed due to concerns around AML/KYC (anti money laundering / know your customer), that benefits of a smoother payments system could be offset by creating competition with bank deposits, or that financial stability could decrease given the potential for bank runs

Source: BofA Global Research

BofA GLOBAL RESEARCH

Developments on crypto-issuer and service provider regulation

42 The EFRAG DP noted that accounting standards have a role in investor protection and are complementary to other strands of regulation.

43 In this paper, we analyse key regulatory developments that have occurred after the issuance of the DP[9] including the EU proposal for the European Commissions' Regulation of markets in Crypto-assets (MiCA), the Basel Prudential regulation and various developments across major markets.

Summary of MiCA

44 A summary of the MiCA regulation is contained in the Ernst & Young report "Crypto-assets – the global regulatory perspective" where it is noted that in September 2020, as part of the larger EU Digital Finance Package, the European Commission took a first step toward the creation of a unified framework for crypto-assets with its proposal for a regulation on MiCA.

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[9] Appendix 3 of the DP had a summary of key regulatory developments

45   The proposal was driven by increased retail and institutional market adoption, concerns about consumer protection and financial stability, and market participants' demands for legal clarity.

46   Where crypto-assets do not qualify as financial instruments, MiCA establishes a harmonized framework for issuers seeking to offer crypto-assets in the EU and for "crypto-asset service providers" wishing to apply for authorisation to provide related services.

47   For example, tokenised traditional securities which qualify as financial instruments still fall under the Market in Financial Instruments Directive (MiFID II), which are therefore out of the scope of the MiCA regulation.

48   MiCA would replace applicable existing national frameworks for crypto-assets not already covered by existing EU financial services legislation.

49   While MiCA represents an important but needed shift in the treatment of crypto-assets in the EU, market participants should realize that the proposal is only in its early stages and will likely have numerous revisions and interpretations as it advances through the legislative process. The current version of MiCA is likely to be amended.

50   MiCA is intended to create an innovation-friendly framework that does not pose obstacles to the application across the Single Market. In contrast, the UK has banned the retail distribution of crypto derivatives and several other jurisdictions are following suit.

Summary of Basel Prudential regulation

51   The Basel Committee issued a public consultation on preliminary proposals for the prudential treatment of banks' crypto-asset exposures. The proposals spilt crypto-assets into two broad groups: those eligible for treatment under the existing Basel Framework with some modification; and others, such as bitcoin and Ethereum, are subject to a new conservative prudential treatment.

52   The consultation period already closed, and the comments received reiterated the importance of developing a conservative risk-based global minimum standard to mitigate prospective risks from crypto-assets to the banking system, consistent with the general principles set out in the consultative document. The next consultative document with a further specification of a proposed prudential treatment will be issued by mid-2022.

Taxonomy applied in regulation

53   MiCA proposes to regulate the issuance and operation of crypto-assets for three distinct payment token categories: utility tokens, e-money tokens (EMT) and asset referenced tokens (ART).

54   The Basel prudential regulation separates crypto-assets into two groups. Group 1a entails tokenised traditional assets, Group 1b includes crypto-assets with stabilisation mechanisms (e.g., stablecoins) and Group 2 contains crypto-assets that do not qualify as Group 1 (e.g., bitcoin). CBDC are out of the scope of the regulation.

Summary of country-specific regulatory developments

Germany

55   The July 2021 HSBC article Digital Assets – European regulatory developments (herein referred to as the HSBC article) notes that, since August 2021, Germany permitted cryptocurrency as an asset class (up to 20 per cent of the portfolio) of the regulated institutional Spezialfonds. The Fund Jurisdiction Act ("Fondsstandortgesetz", FSG) contains this amendment.

56 The impact of MiCA in Germany is expected to be minimal since its requirements are already covered by existing financial regulations in Germany.

France

57 The September 2021 Law Reviews article "The Virtual Currency Regulation Review: France" highlights that the Loi Pacte came into effect in 2021 instead of 2019, because it was amended by the National Assembly and the Senate, and an ad hoc legal framework for intermediaries dealing with cryptocurrencies was added. The only change, thereafter, was the MiCA proposal from the European Commission. MiCA was inspired by the French ICO and digital asset service providers (PSANs) regime. As a result, minimal changes are expected to happen in France.

Switzerland

58 The September 2021 World Economic Forum (WEF) report "Navigating Cryptocurrency Regulation" (herein referred to as the WEF report) states that in 2020, the Federal Act on "Adaptation of Federal Law to Developments in the Technology of Distributed Electronic Registers" was passed by the Swiss Parliament which introduced an expanded framework for regulating blockchain and DLT based on the token taxonomy in the ICO guidelines (2018). This early reaction to crypto-assets helped to reduce the legal uncertainty which in return helped to establish cryptocurrency businesses.

UK

59 The HSBC article notes that both the Bank of England and the Financial Conduct Authority (FCA) published numerous warnings and guidance around the use and volatility of cryptocurrencies. The FCA is also responsible for the ban around the retail distribution of crypto-derivatives.

60 In addition, the consultation period on the UK regulatory approach to crypto-assets and particularly to stablecoins was closed in March 2021. The intention is to introduce principle-led legislation for the financial regulators to implement through rules or codes of practice. Stablecoins would fall under the regulations and exchange tokens are excluded.

US

61 The October 2021 Global Legal Insights (GLI) publication "Blockchain & Cryptocurrency Laws and Regulations 2022" (herein referred to as the GLI publication) shows that the US regulation is fragmented, as it occurs at both the federal and state levels. At the federal level, most of the focus has been at the administrative and agency level, including the Securities and Exchange Commission (SEC), the Commodity Futures Trading Commission (CFTC), the Federal Trade Commission and the Department of the Treasury through the Internal Revenue Service (IRS). While there has been significant engagement by these agencies, little formal rulemaking has occurred.

62 Significant enforcement actions by the SEC, which generally has regulatory authority over the issuance of any token or digital asset that constitutes a security, have included actions brought against Telegram, Kik and Ripple Labs Inc. These actions highlight the SEC's willingness to aggressively enforce U.S. securities laws in cases involving digital assets. With little prospect of legislative action, the hostile environment towards token-generating events in the U.S. is likely to continue for the foreseeable future.

63 There have generally been two approaches to regulation at the state level. Some states are passing favourable laws in order to attract investment, stimulate the economy or move with modern technology, whereas others are much less favourable. New York for example eased its considered restrictive laws for attaining

a BitLicense to attract cryptocurrency companies that previously left the New York market.

64   Even though the regulatory framework in the US is fragmented, it possesses one of the largest numbers of crypto investors, exchanges, trading platforms, crypto mining firms and investment funds.

65   The November 2021 US treasury paper- "Report on Stablecoins" recommends stablecoins be regulated under banking regulation. The report noted that because payment stablecoins are an emerging and rapidly developing type of financial instrument, legislation should provide regulators flexibility to respond to future developments and adequately address risks across a variety of organisational structures. The paper suggests that legislation should require stablecoin issuers to be insured depository institutions, which are subject to appropriate supervision and regulation, at the depository institution and the holding company level.

Canada

66   The June 2021 Thomson Reuters report "Compendium – Cryptocurrency regulations by country" (herein referred to as the Thomson Reuters article) describes Canada as somewhat crypto-friendly as evidenced by the approval of several exchange-traded funds (ETFs). Canadian Securities Administrators (CSA) and the Investment Industry Regulatory Organization of Canada (IIROC) have issued guidance requiring crypto trading platforms and dealers to register with the local provincial regulators. The requirements also apply to foreign-based firms if they have Canadian customers.

China

67   The WEF report also describes the restrictive environment for crypto-assets in China. The Civil Code (2020) recognises cryptocurrency as inheritable property. However, China has banned cryptocurrency exchanges and mining operations. Despite its legal recognition of cryptocurrencies, they are greatly restricted.

68   The focus for China lays on the CBDC, namely the digital yuan, which is currently in development. As a result, the situation for privately issued cryptocurrencies will remain uncertain.

Japan

69   The Thomson Reuters report also describes the situation in Japan. In 2020, Japan was the first country to create self-regulatory bodies, the Japanese Virtual Currency Exchange Association (JVCEA) and the Japan STO Association. The JVCEA and the STO Association promote regulatory compliance and play a significant role in establishing best practices and ensuring compliance with regulations.

Singapore

70   In May 2021, the Asia Business Law Journal article "Crypto regulation in Singapore and Thailand" explains that the Monetary Authority of Singapore (MAS) introduced legislation to regulate the cryptocurrency industry e.g. the Payment Services Act (PSA) which came into effect in 2020. The PSA regulates traditional and digital token-based payments. In 2021, further amendments to the PSA were implemented by MAS to keep up with changes to international standards. The amended PSA grants MAS powers to regulate digital payment token service providers, such as requiring them to ensure the safekeeping of customer assets.

71   In 2020, the MAS proposed to introduce the Omnibus Act (OA) to govern the financial sector in Singapore, which includes the cryptocurrency industry. Under the proposed OA, virtual asset service providers (VASPs) created in Singapore but offering services outside of the country will be regulated. VASPs will be required to be licensed and be subject to ongoing requirements such as the appointment of a

resident executive director, being a Singapore incorporated company, and having a permanent place in the country.

Australia

72   The GLI publication asserts that the Australian Government has a non-interventionist attitude to the regulation of cryptocurrency. This allows the landscape to evolve at a faster rate without significant regulatory limitations. That this growth is a priority for the Government is evidenced by its Select Committee on Australia as a Technology and Financial Centre which published its third issues paper in March 2021. There, the scope of matters was amended to include opportunities and risks in the digital asset and cryptocurrency sector.

73   As well as in payments, there has been a growing expectation that crypto-assets (including cryptocurrencies) will become accepted as an investment asset class. In June 2021, the Australian Securities and Investments Commission (ASIC), launched a consultation process on its proposals to clarify expectations for crypto-assets that form part of the underlying assets of exchange-traded products (ETPs) and other investment products.

Potential implications for accounting of recent crypto-market innovations

74   The ongoing launches of newer blockchains, improvements to existing ones (including the shift from proof-of-stake versus proof-of-work transaction validation mechanisms- also described as mining) are likely to pave the way for ongoing growth in the crypto ecosystem. However, as noted in constituents' feedback to the DP, there is inadequate current IFRS guidance on the accounting for mining activities and these ongoing innovations will likely further compound the accounting challenges.

DeFi accounting and valuation considerations

75   The feedback to the DP indicated that the growing DeFi sector includes six major service categories (stablecoins, exchanges, credit markets, derivatives, insurance, and asset management) of which lending to exchanges, credit markets and derivatives are likely to pose accounting challenges. The below diagrammatic representation (from a 2021 Wharton University of Pennsylvania publication- DeFi Beyond the Hype) highlights the differences between traditional versus DeFi-based business models for exchanges and lending/credit markets.

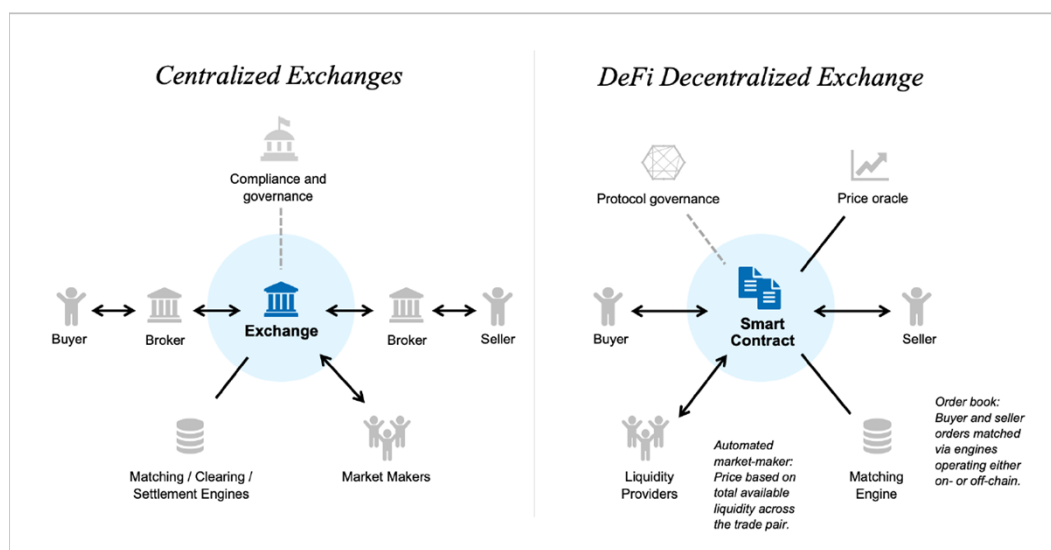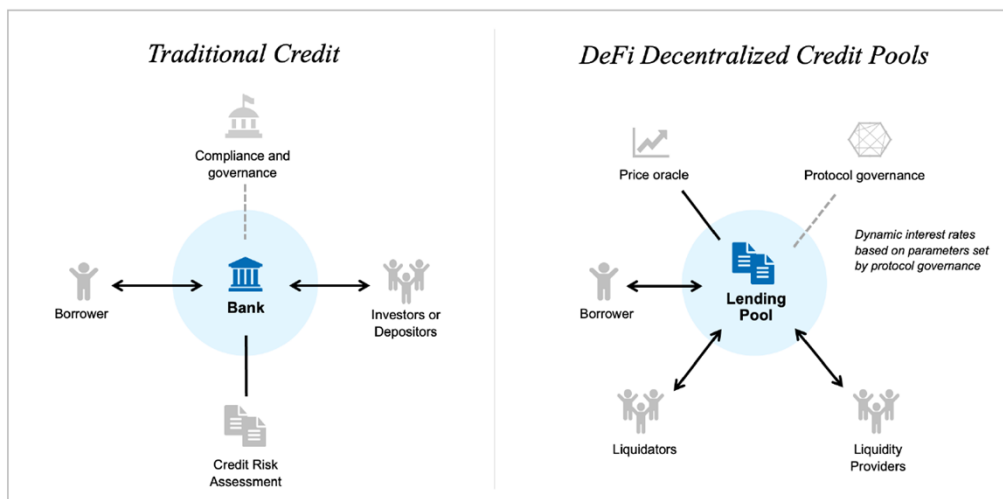**Figure 10 – Centralized Exchanges/DeFi Decentralized Exchange**

Figure 11 – Traditional Credit/DeFi Decentralized Credit Pools

76 As noted in the feedback to the DP, the opaque rights and obligations, complexity, and unique terms/industry-specific jargon (e.g., income streams comprising of liquidity mining/yield farming, lock-up yields) that are used for DeFi lending arrangements[10] may present accounting challenges. Furthermore, accounting challenges may also arise due to the enforceability, valuation, and the evaluation of whether the borrowing arrangements contain embedded derivatives.

77 Similarly, a 2021 paper by the [Wallstreet Blockchain Alliance (WSBA)-Decentralized Finance- A Primer for Accounting Professionals](herein referred to as the WSBA report) notes that additional accounting considerations must be considered given that not all crypto-assets that are part of the DeFi accounting conversation should be treated in an equivalent manner. The WSBA report notes that just a few of the types of DeFi crypto-assets that are going to be accounted for include but are not limited to crypto-assets connected to staking, lending, borrowing, tokenizing real-world assets, and the accounting for crypto-assets that are also linked to the earnings and/or profits of real-world assets. The WSBA paper highlights some of the unresolved accounting questions including:

(a) if an organization is operating as a DeFi lender, and relying on the liquidity pooling to provide that liquidity and financing options to investors, how are these pools recorded and reported?

(b) Should these be viewed as liabilities, akin to how customer deposits are currently viewed at incumbent financial institutions? Conversely, since there is a mutual benefit derived from both the recipient and providers of this liquidity, where do such pools of liquidity fit in the accounting literature?

(c) how are the assets that are created – potentially in the form of earnings that are reinvested into DeFi programs or applications – going to be treated for accounting purposes?

78 There is also the question of the valuation of these newer and more complex crypto-assets and whether traditional valuation methods and fair value measurement approaches described in IFRS 13 *Fair Value Measurement* will be appropriate to value these more complex crypto-assets. This was highlighted by several respondents in their response to EFRAG's DP consultation.

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[10] DeFi arrangements often require crypto-asset holders locking up their crypto-assets with the protocol's liquidity pool in order to receive payments that represent the yield generated on their locked assets. DeFi users borrowing crypto-assets from the protocol pay fees to access crypto-assets from the liquidity pool.

79   As noted by the PwC report, similar to the ICO era back in 2017, there is the question of whether DeFi tokens are securities and their potential eligibility for the financial asset (liability) classification and recognition and measurement requirements.

80   Many DeFi tokens grant the holder the opportunity to participate in the governance process, by essentially giving holders a say in the growth and direction of the respective DeFi platform and the ability to vote on its strategy. It could be argued that this is similar to shares in a company, where shareholders can vote on company decisions (i.e., functional equivalence to equity instruments).

81   Another use of DeFi tokens is participating in staking which is used to mine on the blockchain and generates a return for the holder (that is staking). This return could be seen as being similar to a dividend that traditional shareholders receive. On the other hand, the PwC report notes that another interpretation of staking could be that the token holders are participating in the staking and therefore validation of transactions, which could mean they are performing a service for their reward and are not solely receiving the return for holding the token. These different interpretations could lead to different accounting implications.

NFTs accounting and valuation considerations

82   A July 2021 [Journal of Accountancy article](#) comments on the accounting challenges for NFTs. The article takes the view that NFTs are likely to be classified as intangible assets and they do not meet the definition of cash or cash equivalents, marketable securities, financial instruments, or inventory. However, an intangibles asset classification creates accounting challenges due to the high volatility and speculative nature of the NFTs market.

83   Other areas of lack of clarity include the appropriate accounting for creators of NFTs (i.e., should inventory accounting be applied for the costs and expenses related to minting the NFTs?) Revenue recognition questions may also arise when creators of NFTs sell limited membership of their assets or where there is contingent consideration (i.e., the right to receive a recurring revenue stream if there are future resales of the NFT by the purchaser to others).

84   Furthermore, because of their nature and relatively new use, the valuation of NFTs is an evolving and challenging area. Value is based on perceptions of owners and buyers, scarcity, access, and the distribution channel. There are different valuation considerations for the creator, purchasers, and owners of NFTs at the beginning of their existence and on an ongoing basis as these assets are included on balance sheets. None of the basic metrics you would use to value private companies or traditional investment vehicles like shares or warrants are available for NFTs.

Summary - accounting requirements for recent innovations

85   As noted above, even though the ongoing innovations such as DeFi applications and NFTs may have similar functional features to traditional, well-understood business models (e.g., exchanges or peer to peer lending/borrowing for DeFi and leasing of intangible assets for NFTs), they also represent a rapidly evolving and immature market, and they have opaque, little understood and unique features.

86   Both the DP and stakeholders' feedback underscored the importance of mainly focusing on the economic substance of crypto-transactions and having a technology-neutral approach towards determining their appropriate accounting treatment. Yet it is not straightforward to assess the economic substance and appropriate accounting treatment for transactions related to these latest crypto-market developments. Hence, it is necessary to have further monitoring and research by the IASB before undertaking any standard-setting activity for these transactions.

Questions for EFRAG TEG

87   Do EFRAG TEG members have any comments on the described recent key developments and their implications for accounting?

Appendix 1 – Updated Glossary of terms

TERM	DESCRIPTION
Airdrops	Issuance of tokens for free by platform developers/ICOs issuers. It is one of the ways that crypto-assets get into circulation.
Altcoins	Different characterisations. Some authors describe altcoins as crypto-assets not issued on the Bitcoin network. A more expansive description is any crypto-asset other than bitcoin.
Binary and hexadecimal systems	The commonly applied counting system is the decimal system consisting of ten possible numeric characters (i.e., 0 to 9). The hexadecimal system is based on 16 alphanumeric characters (i.e., 0 to 9 and A to F). There are other systems including the binary system consisting of two numeric characters (0,1). Computer processing is based on the binary system. The hexadecimal system is simply a relatively human reader-friendly representation that can be translated to and interacts well with the binary system. For example, a 64 hexadecimal number can be converted to a 256 (or 64 multiplied by 4) binary system number because each hexadecimal character has an equivalent of four-digit representation of a binary number. To illustrate, the character 1 in hexadecimal is equivalent to "0001" in a four-digit binary system representation and the character F in the hexadecimal system is equivalent to "15" in the decimal system and to "1111" in a four-digit binary system representation.
Blockchain	One type of distributed ledger technology (DLT), which details of transactions and smart contracts are recorded on the ledger in the form of blocks of information. Transactions result in new blocks being added to the blockchain via a computerised process (i.e. cryptographic process). For example, the bitcoin blockchain gets updated with a new block of transactions approximately every ten minutes.
Blockchain token economy companies	Companies business models that entail participation or blockchain-based decentralised ecosystems. A blockchain-based token economy has emerged, driven by the explosive growth in the value and variety of crypto-assets.
Burning of crypto-assets	Burning of coins is the process by which digital currency miners and developers can remove tokens or coins from circulation, thereby slowing down inflation rates or reducing the total circulating supply of coins.
Central Banks Digital Currencies (CBDC)	Central Banks Digital Currencies (CBDC) is envisioned by most to be a new form of digital money with a central bank liability, denominated in an existing unit of account, which serves both as a medium of exchange and a store of value.
Crypto-asset platform developer	Crypto-assets developers that use their own platform to develop new units of crypto-assets (e.g. Bitcoin, Ethereum).
Crypto-asset and crypto liabilities	In the DP, "crypto-assets" are defined as a digital representation of value or contractual rights created, transferred and stored on some type of distributed ledger technology (DLT) network that are authenticated through cryptography. "crypto-liabilities" are defined as obligations that arise from the issuance of crypto-assets that create a present obligation for the issuing entity to transfer or grant access to an economic resource in digital or non-digital form. Other definitions from the EU AML Directive, IMF, ECB and FATF are summarised in the Introduction section.

Cryptography/Cryptographic	The conversion of data into private code using encryption algorithms, typically for transmission over a public network. Cryptography is applied in the overall process of updating crypto-assets transactions on the blockchain including generating digital signatures, verifying the authenticity of transactions, and ensuring via consensus mechanisms/algorithms that there is no "double spend".
Crypto-asset 'coin versus token'	One distinction between a coin and token is that a coin is issued on the crypto-asset developer's platform (e.g. bitcoin on Bitcoin blockchain, ether on the Ethereum blockchain), waves on Waves, ripple on XRP whereas a token can be issued on another network platform (i.e. where a token issuer does not own the hosting platform). For example, Gemini dollar, Filecoin and Documo were issued on the Ethereum blockchain. Another distinction is that coins refer to bitcoin and alt-coins, which were issued originally with the main purpose to serve as "currency," that is, with money and payments-related functions. Tokens have more functions than coins, for example, permitting the coin holders to participate in the service provided or the returns offered by the token issuer.
Crypto Staking	One of the most common DeFI applications in the marketplace can take the form of staking, in which an investor translates the cryptocurrency process into something that is approximately equivalent to true passive income.
Decentralised applications (Dapps)	A decentralised application is a computer application that runs on a distributed computing system. DApps have been popularised by distributed ledger technologies such as the Ethereum Blockchain, where DApps are often referred to as smart contracts.
Decentralised Finance (DeFi)	Decentralised finance (DeFi) is a financial system that reimagines financial transactions by removing intermediaries. It is an emerging ecosystem of financial applications and protocols based on blockchain technology with programmable capabilities, such as Ethereum and Solana.
Decentralised platforms/exchanges (DEX)	A peer-to-peer exchange allows users to trade cryptocurrency without the need for an intermediary organisation, such as a brokerage firm.
Digital autonomous organisation (DAO)	The decentralised autonomous organisation (DAO) is an organisation created by developers to automate decisions and facilitate crypto-asset-based transactions. It is a form of organisational innovation where tasks are automated and governance is decentralised and in the hands of network participants. Their essential feature is that operating rules are programmed and automatically applied and enforced when the conditions specified in the software are met. This differentiates them from traditional organisations, whose rules form guidelines that someone within the organisation must interpret and apply and governance or management is resident within the organisation.
Digital asset and digitised assets	A digital asset is an electronic record in which an individual has a right or interest. They do not exist in physical form. The electronic record is the asset. A digitised asset is an asset (which may be a security or physical asset) the ownership of which is represented in an electronic record (e.g. ownership of real estate represented on a digital ledger). It is an electronic record of ownership of the asset. Digital and digitised assets are represented on an electronic ledger that is not necessarily a blockchain. The process of digitising assets is also referred to as "tokenisation".

Distributed ledger technology (DLT)	Technology that allowed a repeated digital copy of the ledger of transactions. DLT is built upon public-key cryptography (publicly known and essential for identification) and confidential private keys, which are used for authentication and encryption during transactions (i.e. transfer of funds). Blockchain is one type of DLT but there are others (DAG, Tempo).
Distributed consensus mechanism	The process of network participants within a DLT environment of agreeing on one state or result in the distributed ledger.
FinTech	Technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services.
Fork	A fork is a change to the DLT protocol that can arise for several reasons (e.g. security, or if part of the community wants to take the project in a different direction). Hard fork creates two versions of the protocol and an additional alternative crypto-asset. Examples of forks in the Bitcoin DLT are the creation of Bitcoin ALL, Bitcoin Cash Plus, Bitcoin Smart, Bitcoin Interest, Quantum Bitcoin, Bitcoin Lite, Bitcoin Ore, Bitcoin Private, Bitcoin Atom, Bitcoin Pizza and Bitcoin Gold.

A soft fork is also an update to the blockchain protocol; however, one version (assumed to be the updated or new version) is supposed to be adopted by the majority and will become the dominant one. |
| Fungible tokens versus non-fungible tokens | Fungible tokens are easily replaced by identical tokens while non-fungible tokens are not easily replaced by identical tokens because they offer unique characteristics and are digitally scarce. Most crypto-assets are fungible tokens, but some utility tokens may be non-fungible tokens. |
| Initial coins offerings (ICOs) and other similar offerings such as Security token offerings (STOs), Initial exchange offerings (IEOs), Initial Security Offerings (ISOs), Security Exchange Offerings (SEOs) and Initial Decentralised Offerings (IDOs) | ICOs: an operation through which companies, developers raise capital for their projects in exchange for crypto-assets. It is one of the key mechanisms for the supply or issuance of crypto-assets. Issuers sell a predefined number of digital tokens (coins) directly to the public in exchange for cryptocurrencies or fiat currencies.

STOs: sale of tokens with features comparable to normal securities (i.e., fully regulated and approved) within at least one jurisdiction.

IEOs: an ICO (STO), which is exclusively conducted on the platform of a cryptocurrency exchange. IEOs are administered by the crypto-exchange on behalf of the issuing company, which seeks to raise funds with its newly issued tokens.

ISOs: are securities tokens on the blockchain. They are a tokenised offering similar to ICOs but need to be compliant with specific regulatory guidelines.

SEOs: are offered through an exchange rather than directly by a start-up or a developer.

IDOs: are token issuances that take place on decentralised exchange platforms rather than centralized fundraising or cryptocurrency exchange platforms. |
| Liquidity Mining | Also known as "Yield Farming", is a practice in which a network participant provides liquidity to a pool of existing crypto-asset resources. In exchange for "lending" these crypto coins or tokens to the existing pool, the lender/investor is rewarded with a rate of return in the form of new coins or tokens. |
| Mining-based consensus mechanism – Proof-of-work (PoW) Validators-based | Mining is a process of establishing consensus to verify and confirm transactions within a DLT environment. It occurs during the update of new transactions on the distributed ledger (e.g. blockchain) and entails the |

consensus mechanism - Proof-of-stake (PoS)	solving of cryptographic puzzles by individuals and/or entities that are network participants. Solving the puzzle (i.e. first participant to solve) is a pre-requisite for updating transactions on the blockchain distributed ledger. Mining is also part of the process of increasing the overall supply of crypto-assets in circulation.
	PoW requires a cryptographic process and is an energy and computational power-intensive process that tends to occur in jurisdictions with cheap electricity. PoW validation is open to all participants in the network.
	PoS is a form of consensus mechanism within a DLT environment that requests network participants to demonstrate ownership of pre-defined crypto-assets. Participants can mine or validate block transactions according to their ownership of crypto-assets. Hence, only participants with ownership stakes in the network can undertake PoS.
	There are other consensus mechanism algorithms (e.g. Practical Byzantine Fault Tolerance (PBFT) that is used as the consensus algorithm for Ripple-XRP and NEO uses a delegated PBFT)
Nodes	These are the computers connected to the distributed network that keep track of and process data transactions
Non-fungible tokens (NFTs)	NFTs are a unique and non-interchangeable unit of data stored on a digital ledger.
Off-chain and On-chain transactions	On-chain transactions are those that are recorded on the blockchain
Open-source software	Open-source software is a type of computer software in which source code is released under a license in which the copyright holder grants users the rights to use, study, change, and distribute the software to anyone and for any purpose.
Peer to peer	The mode of use of a network in which each of the connected parties has the same rights and which allows a direct exchange of services without resorting to a central server, the term is used to describe such a network
Permissioned DLT	A DLT network in which only those parties that meet certain requirements are entitled to participate in the validation and consensus process.
	A further distinction can be made between private and public permissioned-DLT.
	For the private permissioned-network, there is an architect or owner that decides who can participate and which node will run the consensus process. An example is IBM's Hyperledger Fabric and R3's Corda.
	For the public permissioned-network, everyone has access to the full transaction history, but a restricted number of nodes can participate in the blockchain's consensus mechanism.
Permissionless DLT	A public permissionless DLT network is one in which virtually anyone can have access to the full transaction history and become a participant in the validation and consensus process (e.g. Bitcoin, Ethereum). A private permissionless network is where everyone can be a participant in the consensus process but permission is needed to access full transaction history.
Private key	The private key is required to send crypto-assets. Anyone with the key has sole access to the funds. The private key enables the creation of a unique digital signature for each transaction.

Public key	The public key is the identifier that allows receipt of transferred crypto-assets.
Pre-functional tokens	Pre-functional tokens are tokens that are transferable via a protocol on the DLT network but cannot yet offer utility on the network. Effectively, these are pre-sales tokens issued before the network is launched and will typically convert to utility tokens once the network is active.
Simplified agreements for future tokens (SAFTs)	SAFTs are agreements that represent their holders' rights to future tokens. SAFTs are only available in some jurisdictions (e.g. the US) and are typically classified as securities.
	SAFTs work by "bifurcating the securities and token components of a transaction while preserving the many benefits associated with ICOs" and keeping the utility component (the "functional token" not as likely to be a security) separate from the security-like component (the "non-functional token").
Smart contracts and Ricardian contracts	Smart contracts are computer programs that are capable of carrying out the terms of an agreement between parties without the need for human coordination or intervention (e.g. an insurance smart contract that initiates payment if there is a flight delay).
	A Ricardian Contract is a document that outlines the intentions and the actions that will be undertaken. The Ricardian Contract is the best effort to record the agreement; a smart contract is the execution of the said agreement.
	In addition to crypto-assets, some blockchain platforms also support smart contracts. The most prominent smart contract platform is Ethereum.
Taxonomy	System of grouping objects of common interest in a domain based on common characteristics.
Crypto-asset classification taxonomy (as noted, there is diversity in classification taxonomies applied)	Below are elements of commonly applied categorisation of digital tokens (crypto-assets): • Payment tokens that are cryptocurrencies with no claim on the issuer. • Stablecoins that can also be classified as payment tokens or security and asset tokens or hybrid tokens. • E-money tokens (proposed by the UK FCA but not yet a widely applied categorisation): defined as e-money based on jurisdictional definitions and can overlap with the other categories of tokens. • Security and asset tokens: tokens with specific rights and obligations similar to specified investments (equity, debt, unit investment). • Utility tokens: tokens that can confer a variety of network-associated rights including granting holders access to a current or prospective product or service. • Other (hybrid tokens and pre-functional tokens).
Tokens	As noted above, tokens are crypto-assets residing on existing other blockchain and not on developers blockchain.
	French Loi Pacte definition: a token constitutes any intangible asset representing, in digital form, one or more rights, which can be issued, recorded, stored or transferred by means of a DLT making it possible to identify, directly or indirectly, the owner of said asset.
Wallet provider (Hot wallet and cold wallet)	A firm that offers storage services to holders of crypto-assets and these could be online (hot wallet) or offline (cold wallet)

Appendix 2 – References

88   The following were the principal sources of information:

(a)   November 2021 PwC report: *Non-Fungible Tokens (NFTs): Legal, tax and accounting considerations you need to know*

(b)   October 2021 Bank of America report: *Digital Assets Primer: First Innings*

(c)   October 2021 Global Legal Insights (GLI) publication: *Blockchain & Cryptocurrency Laws and Regulations 2022*

(d)   October 2021 Goldman Sachs article: *Opportunities and Risks in Decentralized Finance (Pandl/Rosenberg)*

(e)   October 2021 International Monetary Fund (IMF) *Global Financial Stability Report*

(f)   October 2021 McKinsey & Company report: *CBDC and Stablecoins: Early coexistence on an uncertain road*

(g)   October 2021 PwC report Defi: *Defining the future of finance* (based on data obtained in June 2021)

(h)   September 2021 The Law Reviews article: *The Virtual Currency Regulation Review: France*

(i)   September 2021 World Economic Forum (WEF) report: *Navigating Cryptocurrency Regulation*

(j)   July 2021 Ernst &Young report: *Crypto-assets – the global regulatory perspective*

(k)   July 2021 HSBC article: *Digital Assets – European Regulatory Developments*

(l)   July 2021 Journal of Accountancy: *NFTs come with big valuation challenges*

(m)   June 2021 Thomson Reuters report: *Compendium – Cryptocurrency regulations by country*

(n)   May 2021 Asia Business Law Journal article: *Crypto regulation in Singapore and Thailand*

(o)   May 2021 Goldman Sachs report: *Crypto: A New Asset Class?*

(p)   May 2021 WallStreet Blockchain Alliance: *Decentralized Finance- A Primer for Accounting Professionals*

(q)   May 2021 Wharton University of Pennsylvania publication: [DeFi Beyond the Hype](#)

(r)   April 2021 Forbes Advisor: *Decentralized Finance Is Building A New Financial System*

(s)   Internet-based data sources such as https://coinmarketcap.com/, https://www.theblockcrypto.com/ and other relevant sources.