Association for Financial Markets in Europe

Decentralised Finance

Principles for building a robust digital economy

July 6th 2023

Executive Summary

AFME is supportive of the development of a thriving digital economy within a clear legal and regulatory framework. As these frameworks continue to emerge around the globe, we believe that this is a crucial moment for the financial services industry and regulators to mitigate risks and prevent any unintended gaps in regulator perimeters. In particular, we believe it is crucial to avoid the potential exclusion of so-called "decentralised activities" as this could open opportunities for regulatory arbitrage and weaken the application of emerging frameworks. This exclusion could create unintended risks to financial stability and potential knock-on impacts. While as noted by the Financial Stability Board (FSB)[1] the current overlap of DeFi and Traditional Finance (TradFi) is not yet significant, this should be actively monitored and managed.

Our white paper discusses the following principles:

1. The importance of developing a foundational taxonomy classification mechanism for DeFi (and DeFi activities) as well as digital assets.
2. Further research and global cooperation should be encouraged to determine the appropriate, proportionate, and comprehensive regulatory solutions for the unique challenges posed by DeFi.
3. It is crucial to leverage existing processes and frameworks to create a holistic regulatory perimeter. Our paper includes recommendations for:
    a. Requiring authorisation prior to conducting regulated financial activities;
    b. The importance of choosing an appropriate accountability structure;
    c. An initial industry view on establishing a risk-based approach to DeFi; and
    d. Support for a 'Level Playing Field' and working towards consistent regulation despite varying levels of centralisation.

However, in discussing these principles it is important to note that this area of the market is still rapidly evolving and changing. This paper is not intended to be a definitive solution to the challenges posted by DeFi. It is instead a foundational piece of work to further explore some of the technical issues posed by this new area of digital finance, as well as raise some initial proposals on how DeFi could be addressed from a regulatory standpoint. We aim to open an initial discussion across industry on this topic, and look forward to continuing to work on innovative policy solutions for DeFi with both the public and private sector, especially as we look ahead to the Regulatory Technical Standards (RTS) for the Markets in Crypto Assets (MiCA) Regulation, and eventually MiCA 2.

Introduction

The Association for Financial Markets in Europe (AFME) has welcomed the opportunity to comment on the recent EU consultations on both MiCA and the DLT Pilot regime as well as recent UK consultations and calls for evidence such as, Future financial services regulatory regime for cryptoassets - Consultation and call for

[1] https://www.fsb.org/wp-content/uploads/P160223.pdf

evidence. Building on these engagements, AFME has developed the following paper, to discuss the capital markets macro viewpoint of key aspects of DeFi, the impact of policy and emerging regulatory proposals within Europe on the regulation of decentralised finance and its intersection with capital markets.

We believe that decentralised finance (DeFi) and its associated activities must be brought within the regulatory perimeter in an appropriate way to manage risks to market integrity, financial stability, and end users, while still promoting financial and technological innovation. While we welcome European legislators considering important market development such as Decentralised Autonomous Organisations (DAOs), we feel further consideration of the scope, nature and implications of decentralised activities is crucial.

We seek to complement our recently submitted consultation responses[2] and provide industry insights and use cases to illustrate how DeFi could be brought within the regulatory perimeter, as well as to note any unintended gaps where further regulation or analysis may be required as new products and technologies continue to develop. However, we would note that the industry remains nascent and is continually evolving. While the capital markets use cases are still relatively unknown, AFME believes that DeFi that operates within a regulatory perimeter could scale to successful future use cases and achieve broader adoption alongside other capital markets use cases for distributed ledger technology. Furthermore, we believe it is crucial for capital market banks to contribute to discussions on Defi as they act as a key transmission mechanism for economic and monetary policy and efficiently allocate capital through their borrowing, lending, structuring investment opportunities, providing investment advice and acting as liquidity providers in markets. All these actions will continue and the use of smart contracts to create effective permissions on public permissionless DLT networks (i.e., with appropriate Know Your Customer (KYC)/Anti Money Laundering (AML) mitigations) will create opportunities to increase efficiencies and decrease cross border transactional friction through the application of common global standards. This is similar to how the internet improved for the transfer of information. If used in a responsible manner (i.e., known identity and permissioning of access) blockchain based solutions can also offer improved trust, security, transparency, and traceability over alternative legacy methods.

Current DeFi efforts can be seen as outsourced innovation and research and development (R&D) labs for the formal financial system. DeFi efforts can build and test new primitives (e.g., borrowing, lending, trading, and investing using different token formats, smart contracts, and encryption approaches) on these common standards. While the initial focus has been on DeFi payments, as that has the current highest-level activity, we believe the impact on the real economy will be driven through the impact of these new DeFi like approaches on the processes of borrowing, lending, investing, market making and transferring tokenized assets with the potential for a decrease in counterparty and settlement risk. AFME primarily represents a broad array of pan-EU global and regional banks.

As such, the below examples are not necessarily use cases that AFME members would engage in, however we would provide the below views for regulatory consideration. These views are based on observations of the capital markets industry on the potential use cases for DeFi. These real economy tokenized asset types (e.g., property assets, goods and services, collectibles, gaming, metaverse assets, brands, IP) in the future could be lent against, invested in, traded, or have conditionality coded into transfer contracts could potentially include:

Tangible Real-World Assets on Chain (E.g., investible assets, goods, and services)
Secured deposit tokens backed by Central Bank Digital Currencies (CBDC), or HQLA tokenized bonds and tokenized ABS (similar to a vertical slice of the capital structure of a bank) could utilise the same blockchain to transfer underlying assets (like mortgages) without credit risk between deposit tokens. For example, when a new improved rate is offered based on the metadata the borrower has decided to expose, this creates a new financial market where previously there was only a bilateral relationship due to the manual nature of transfers.
Another example is the settlement of home purchase chains. This could be coded into a smart contract that transfers the record of ownership, removing settlement risk and providing certainty to homeowners. Banks involved in lending attest to their willingness to lend prior to the settlement date, and using cryptography could increase the efficiency of a bank's mortgage departments.

[2] ACPR DeFi Discussion Paper Response: https://www.afme.eu/Portals/0/DispatchFeaturedImages/AFME_ACPR%20DeFi%20Consult%20Response%2019.05.23.pdf ; HMT Consultation Response: https://www.afme.eu/Portals/0/DispatchFeaturedImages/AFME_HMT%20Crypto%20Consultation%20Response%2028.04.23.pdf

Real world assets provided by a custodian or central administrator require regulatory bridges so will probably take the longest but will also have the largest impact. Tokenized investible assets on common cross institution standards could materially reduce the settlement costs when compared to the existing system, in turn reducing costs for end users.

Real world assets linked to a digital token can provide a better experience to consumers in some situations. For example:
- QR code based tickets to sporting events can be replaced by NFTs removing the risk of turning up to an event and finding it has already been used because someone has resold the ticket multiple times (Ticketmaster released token gated event sales in March 2023). This can reduce the risk of purchase disputes over payments.
- NFTs linked to Near-field communication (NFC) tags can prove physical items of clothing are genuine, in a way that holographic stickers are unable to, reducing the market for fake versions of trademarked goods. (Nike subsidiary RTFKT[3] have released multiple NFT linked apparel goods in 2023). The existence of these NFC tags offers opportunities for traceability in supply chain financing.
- Individuals with flexible travel plans could resell a Digital Asset representing a future night in a hotel room peer to peer in the event someone urgently needing to travel is willing to offer them a premium (offers can be made direct to their wallet in a way that is not possible bilaterally today with zk proofs limiting the information shared publicly).

Intangible Real-World Assets Represented on Chain (E.g., brands and IP)
There are high levels of friction in IP (Intellectual Property) rights and royalty transactions. The world's largest online royalty marketplace (Royalty Exchange) has only traded 135m USD to date[4] while estimates based on listed US stocks show up to 90%[5] of their value could be attributed to intangible assets. Loyalty point schemes to reward brand loyalty can be created in seconds using open source software on the blockchain (e.g. Starbucks Odyssey released NFTs in 2023[6]). Crowdfunding artists/musicians can raise funds while at the same time use tokens on the blockchain to create token gated online platforms for their fan community in Discord (192m active monthly users[7]). Tokenization using common standards and cryptographic proof of ownership transfer has the potential to create a genuine global marketplace for intangible assets which existing financial primitives can be applied to.

On Chain Only Assets (E.g., collectibles, gaming and metaverse assets)
The gaming industry market size is approximately 250bn USD in 2023[8]. The recent metaverse report from Citi (Money, Tokens and Games – March 2023[9]) highlights that of the existing 3bn gamers globally there could be as many as 50-100m accessing games through Web 3 games (which would require digital assets/wallets) by 2025. The winner of the recent Dookey Dash game by Yuga Labs sold the Digital Asset they received for first place on a blockchain marketplace for 1.6m USD[10] while other players hired professional gamers[11] on a pay-per-result basis in order to get a higher leaderboard position. A recent report by UBS (Metaverse – April 2023[12]) also highlighted the potential for advertising, "in person" virtual music events (for example Travis Scott's Fortnite concert had over 12m[13] concurrent viewers generating millions in sales) and interoperable avatars within metaverse games to take an increasing chunk of the 2tn USD global media and entertainment industry revenues.

Given the potential of these emerging use cases, as well as the risk of unintended gaps as regulatory frameworks continue to emerge, AFME members believe it is important for industry and regulators to work together towards comprehensive solutions. The following paper sets our AFME member views on DeFi and aims to contribute to ongoing public and private sector discussions on varying regulatory approaches to this sector of digital finance. These views are presented through discussion of the following sections, each setting out a core principle:

1. The importance of developing a foundational taxonomy classification mechanism for DeFi (and DeFi activities) as well as digital assets.

[3] https://rtfkt.com/
[4] Royalty Exchange: Buy & Sell Music Rights & Copyrights
[5] WIPO and Intangible Asset Finance
[6] The Starbucks Odyssey Begins
[7] How Many People Use Discord? (Discord Statistics 2023) (thesmallbusinessblog.net)
[8] Gaming Is the Next Super Platform | Accenture
[9] https://ir.citi.com/gps/MG9DEWhoYvQJVWLM9Kr3%2BZmqjoztKJcyNHr83F9Wug2pzAGHPQKfp23RAMrkNts%2FJitXoTNqufOvegUjjXh0IA%3D%3D
[10] Ethereum Transaction Hash (Txhash) Details | Etherscan
[11] The Block: Bored Ape NFT game attracts pros angling for a piece of the Dookey
[12] file:///C:/Users/Elise.Soucie.AFME/Downloads/Longer%20Term%20Investments_en_1588445.pdf
[13] More than 12m players watch Travis Scott concert in Fortnite | Fortnite | The Guardian

2. Further research and global cooperation should be encouraged to determine the appropriate, proportionate, and comprehensive regulatory solutions for the unique challenges posed by DeFi.
3. It is crucial to leverage existing processes and frameworks to create a holistic regulatory perimeter. Our paper includes recommendations for:
    a. Requiring authorisation prior to conducting regulated financial activities;
    b. The importance of choosing an appropriate accountability structure;
    c. An initial industry view on establishing a risk-based approach to DeFi; and
    d. Support for a 'Level Playing Field' and working towards consistent regulation despite varying levels of centralisation.

1. Defining DeFi –The importance of developing a foundational classification mechanism for DeFi (and DeFi activities) as well as digital assets

The range of financial services activities offered via DeFi is quite broad but highly specialised. Specialised market participants willing to tolerate the underlying risks of crypto activities can access a range of services such as savings, lending, trading, insurance, and risk hedging among many others.

AFME supports regulators in their aim of developing a balanced digital economy where innovation and new technology can deliver benefits to the wider economy while also minimising any unintended regulatory arbitrage. The importance of developing a level playing field will be further discussed in section 3 where we set out recommendations to implement the principle of 'same activity, same risk, same regulatory outcome'.

According to a recent Bank of International Settlements (BiS) research paper, DeFi is, "A new financial paradigm that leverages distributed ledger technologies to offer services such as lending, investing, or exchanging crypto assets without relying on a traditional centralized intermediary. A range of DeFi protocols implements these services as a suite of smart contracts, i.e., software programs that encode the logic of conventional financial operations. Instead of transacting with a counterparty, DeFi users thus interact with software programs that pool the resources of other DeFi users to maintain control over their funds."[14] HMT in their call for evidence (CFE) defines DeFi as, "An umbrella term used to cover a range of financial services – including lending, exchange, asset management and insurance – which are offered without the use of traditional financial intermediaries. Programmers and developers use the coding language of a blockchain to create "smart contracts". These represent open sourced, codified sets of rules which automatically execute and record transactions on the blockchain when certain parameters are met."[15] While these are both beneficial starting points from which to understand DeFi activities, AFME would encourage regulators to instead focus on the extent of decentralisation, and providing, where possible, clarity for networks with knowable participants (private blockchains) where rules can be enforced, and individuals held accountable. Given the rapid evolution of DeFi – using classification mechanisms could be useful so that regulators can continue to adapt regulation as the market continues to grow.

This proposal below is an initial starting point for a classification of DeFi and its associated activities. It is designed to help regulators evaluate which types of regulations should apply to which type of decentralised activities. We note however that as DeFi evolves and potentially new activities are created, any global taxonomy or classification system that is set out by either the public or private sector would need to be updated over time. We would still encourage that a global taxonomy which could eventually include definitions of DeFi, and its associated activities be developed through the establishment of a joint taskforce between industry and regulators to develop such a global taxonomy as a foundation for the broader framework, as noted in our response to the FSB's Crypto Asset Consultation[16] as well as the recently published GFMA paper on tokenisation[17]. This global taxonomy should be comprehensive, but also have the ability to be reviewed and adapt with time and new innovations.

[14] https://www.bis.org/publ/work1066.htm
[15] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1133404/TR_Privacy_edits_Future_financial_services_regulatory_regime_for_cryptoassets_vP.pdf
[16] https://www.gfma.org/wp-content/uploads/2022/12/gfma-response-to-fsb-crypto-asset-consult-15-december-2022.pdf
[17] https://www.gfma.org/policies-resources/gfma-publishes-report-on-impact-of-dlt-in-global-capital-markets/#:~:text=The%20report%20finds%20that%20DLT,at%20scale%20(e.g.%2C%20approximately%20%2416

The below sets out our initial views on classification mechanisms and we will use these terms throughout our paper. These initial definitions could be used as a starting point for building a European taxonomy for decentralised finance.

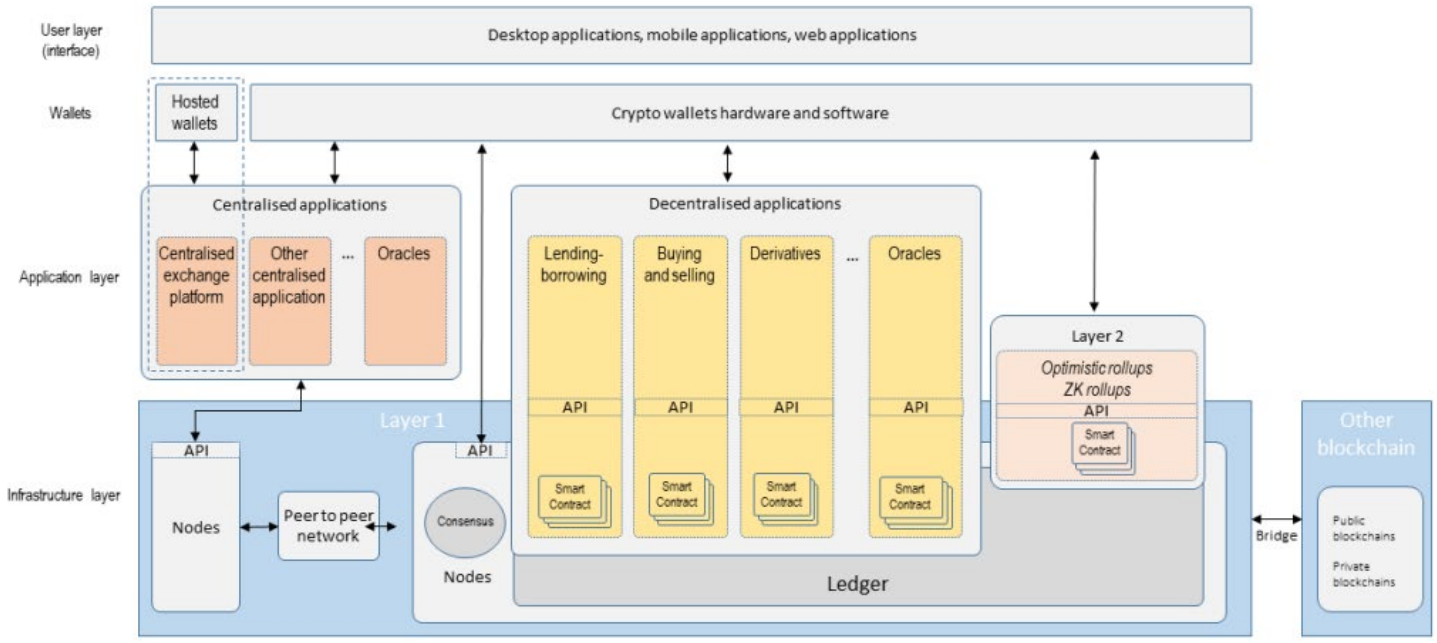
Decentralised Finance (DeFi)

DeFi structure and composability has several hierarchical layers which are built on one another. These layers are[18]:

- **Settlement layer (the Infrastructure Layer in the ACPR Consult)**: manages the ledgers by recording changes to the state of the blockchain (e.g., payments) and sets incentives for validators and miners to maintain the chain (e.g., process transactions). These are the core protocols within a distributed ledger infrastructure (e.g., Ethereum). This layer is also responsible for the network's fundamental operations including the consensus mechanism, dispute resolution, and other technical enablers.
- **Token layer (the Application Layer in the ACPR Consult):** is where crypto assets are created. This includes non-fungible and fungible tokens like stablecoins, governance tokens, etc. Protocols are built on top of the settlement to extend functionality, typically with regard to privacy, permissioning and performance requirements. The token layer protocols often use processing elements that run outside of the core chain to enhance scalability (e.g., zero-knowledge roll-ups) and cost inefficiencies (e.g., transaction costs) of the settlement layer protocol.
- **Application layer (the User Layer in the ACPR Consult)**: the broad application layer interacts with the underlying network to provide interoperable, functional utility to end-users, including decentralised exchanges, liquidity provisioning, and liquid staking applications. It is where most DeFi protocols are integrated as they rely on both settlement and token layers to execute their associated smart contracts. This layer also may contain applications for services such as credit, decentralised exchange, asset management and derivatives.

These layers are demonstrated well in the below diagram as set out in the recent discussion paper on DeFi[19] by the ACPR Banque de France:

Diagram: The application architecture of "DeFi"



[18] https://finance.ec.europa.eu/system/files/2022-10/finance-events-221021-report_en.pdf

[19] https://acpr.banque-france.fr/sites/default/files/medias/documents/20230403_decentralised_disintermediated_finance_en.pdf

The following are additional key terms that comprise different elements of a DeFi ecosystem. We would note again that these are continually evolving definitions but are important to set out before we further set out our broader analysis.

DeFi lending: DeFi lending platforms bring together lenders and prospective borrowers through collections of smart contracts which most users interact with through interfaces that might be referred to as platforms. Without a central intermediary (such as a bank) the parties are brought together via these platforms and must follow the pre-established rules of the smart contracts. The lender depositstheir crypto assets into a liquidity pool and the borrower pays a borrowing rate. The rates vary by the crypto asset and are also determined by the demand for loans and the size of the liquidity pool. As the process is automated, loan disbursement is nearly instantaneous and associated costs are modest.

DeFi lenders: Individual depositors who lock their crypto assets into so-called liquidity pools, earning a lending rate.

DeFi Borrowers: Individuals who receive crypto assets and pay a borrowing rate.

DeFi platform: is the interface that leverages the collection of smart contracts. Most customers, both corporate and retail use DeFi platforms through the interface. – charges a fee usually paid by the borrower for their services of setting the pre-specified rules and the rate.

DeFi exchanging: Practice of trading cryptocurrencies or tokens on decentralised exchanges (DEXs), that are built-on blockchain networks.

DeFi oracle: A software program that connects blockchain-based smart-contracts to real-world off-chain data providers to provide necessary data for the operation of the decentralised finance applications.

DeFi protocols: provides one or more financial services to economic agents. Financial services are implemented as program functions by one or more smart contracts.

DeFi bridges: some parts of DeFi contain digital only on chain bridges which in turn require a trusted counterparty to manage the cross-chain bridge (E.g. wrapped BitCoin (wBTC) where an entity issuing tokens on ETH needs to hold an exactly equal amount on the native BitCoin chain). This introduces a separate set of risks that need to be managed (Although the monitoring process is simpler than the bridges to the real-world assets as the checks can be automated by an oracle system like Chainlink). In addition, this means the trusted counterparty can be a centralised organisation with a location that can be subject to regulation which is different to some of the pure DeFi use cases described above.

Non-Fungible Tokens: A type of digital asset that is unique and not interchangeable with other tokens. Unlike fungible assets, like cryptocurrencies, each NFT is distinct and cannot be replicated.

Further to the above definitions, it is also crucial to clarify the level of decentralisation of a DeFi platform or app, as many that self-qualify as decentralised organisations are in fact centralised. Therefore, AFME would suggest that there is a spectrum of decentralisation. For example, there could still be centralised activities occurring on a decentralised network. While different use cases may lie at different places on the spectrum and have their own specific risk profiles, we would set out three generally accepted classifications of decentralisation each of which leads to different risks and controls being required:

Type 1 - Smart contracts which are DINO (Decentralised In Name Only) however are still centralised by design. These contracts can be fully upgraded by individuals, multi-signature wallets or multi-party computation (MPC) smart wallet approvals. The person or people who control the private keys are responsible for the actions of the code and can change the beneficial owner used as the output of the contract. We would recommend that these be regulated under existing financial regulatory frameworks as due to their centralised nature sit outside of the scope of true DeFi.

Type 2a - Smart contracts with either a Decentralised Autonomous Organisations (DAO) where voting occurs off chain and the instructions are passed to a Type 1 individual or group who then upgrade the contract or where there is a DAO with majority voting power in the hands of a small number of key individuals. This is essentially a Type 1 level of decentralisation with an additional layer of abstraction as off chain instructions could be ignored by the key holder (no direct effect) and DAO's where the majority of voting rights are held by a small subset of individuals are also similar to Type 1.

Type 2b - Smart contracts with on chain voting by a large number of truly decentralised and anonymous DAO participants. As no upgrades can be made effective without the upgrade being publicly known first through the voting proposal, this is similar to a Type 3 in terms of level of decentralisation.

Type 3 - Smart contracts where the contract isn't upgradable in any way and/or there is no longer a central organisation running it (the number of these will increase as the space matures given the immutability of the blockchain) and/or the private keys for upgrading a contract have been lost.

So, in practice and depending on the classification set out above, one could measure "decentralisation" for a DAO by looking at the percentage of ownership of the governance tokens by a wallet or a set of wallets owned by a single party. Or, if that is not possible, one could also look at the liquidity concentration (e.g., measured by density of unique wallets providing liquidity). However, this could be challenging without the verification of ID to prove that it is unique.

In summary, we believe that as DeFi evolves and potentially new activities are created, these characterisations may need to be updated over time. However, we would still encourage that regulators and global standard setters continue to work together with industry to eventually agree common global definitions for DeFi and how it is characterised. We believe that this will contribute to a more comprehensive regulatory framework both in the EU and globally.

2. Unique Challenges Presented by DeFi

We first would also set out the below unique issues related to the regulation of DeFi on a decentralised public blockchain for further consideration both by regulators and market participants.

1. The 'Counterparty' is a smart contract that is executed on all decentralised nodes with no 'home' jurisdiction or 'home' regulator

- In DeFi, several entities, apps and nodes with multiple jurisdictions provide different parts of a service, and customers are likely to be scattered and diversified across the globe. Current financial regulations traditionally establish their scope depending on the location from which financial services are being provided and where the entity providing the service is established. However, this type of framework cannot easily be applied to DeFi's multi-jurisdictional characteristics.
- When executing a DeFi trade the trade is executed by the trader's wallet against a smart contract (and not against another trader). In a decentralised public chain with nodes distributed globally this means that the counterparty (a smart contract not a natural person or regulated entity) doesn't have a single physical 'home' location so the only participant in the transaction with a physical location is the end user. The 'middleman' or exchange based smart contract is not regulated.

- One can consider the precedent set by a 'tumbler' used for money laundering purposes (Tornado Cash). This was a smart contract with no 'home' jurisdiction. The US authorities could not close it down, so they put the onus on users. It was placed on the OFAC (Office of Foreign Asset Control) sanctions banned list. Usually, this list is reserved for nation states (N Korea, Russa, Iran etc) or private individuals. This was used on code (smart contract) for the first time. There are further implications to this lack of 'home' jurisdiction for the smart contract.

2. A smart contract will continue to exist even if initial uploading organisation disbands

- When executing a DeFi trade the contract is normally accessed through a front-end web page. This is just a visual interface used for interacting directly with the blockchain in a convenient way. Technically adept individuals can instead interact directly with the smart contract on the blockchain without going through the 'official' web page or indeed other 'non-official' web pages built by third parties to interact with the same smart contract for the same effect.
- Given that smart contracts uploaded to the blockchain are permanent this means that even if the contract is uploaded by an organisation (either a DAO or centralised team) it will continue to exist in use even if the initial team disbands for any reason.

3. Smart contract code is publicly viewable and easy to duplicate

- As all code on a public chain is publicly viewable any existing complex code created by a large team can be copied by anonymous individuals and re-uploaded as is with a lower spread taken out of the contract as a fee (Indeed it can be changed to remove any restrictions added by the initial team that built it). The benefit of this is that any end user can check exactly what the code does before using it however as was seen with Sushiswap's 'vampire' attack on Uniswap (where Sushiswap offered the possibility of free airdropped tokens to liquidity providers that switched) there is a race to zero in terms of fees.

- The solution to the ease of copying code is likely to be similar in analogy to that seen with the early DRM (Digital Rights Management) efforts in the CD industry where ease of use has resulted in most people moving to streaming service. In the early days of MP3s being easily swapped for free online (Napster, BitTorrent etc) it looked like there was no way of protecting IP. However, with streaming services that were genuinely valuable to users (e.g., iTunes, Spotify and value adding AI playlists and extensive catalogues) users would be willing to pay a subscription AND put up with DRM.

4. Smart contracts can be used by other smart contracts in ways the original creator didn't intend

- Unless restrictions are hardcoded (which as per point 3 these can be removed by copying then editing) it's possible that software built for one purpose on chain can be reused for another purpose different to the original intent when originally uploaded. For example, this complexity could occur due to the potential composability of the smart contracts. Composability is the combining of distinct components to create new outputs, components, and/or systems. If a smart contract is discoverable (open-source and in the public domain), autonomous (able to operate independently of the original creator) and modular (an individual component that performs a specific task) then in general the smart contract would be considered composable – and thus more complex to regulate.

- Although not specifically DeFi related, there are other interesting cases of smart contracts being used in ways that were perhaps not originally considered by their creators. For example, NFT trading platform OpenSea banned smart contracts that used allowed trading of their tokens on its competitor platform Blur from receiving full functionality on their exchange (using a blacklisting of Blur contract addresses). Blur then split its settlement contract for trades on its exchange where the tokens were part of the blacklist. The new settlement flow used the settlement contract of OpenSea itself for its back-end infrastructure (Same front end Blur website) meaning OpenSea wasn't able to enforce the block as it would involve blocking its own contract from being able to settle the tokens too. In addition, aggregator platforms like 1inch use multiple underlying decentralised exchanges like Uniswap and Sushiswap without needing to ask for permission to use them.

- The current state analogy would be someone copying access to the NYSE or LSE and having it run in a different country X without needing the permission of LSE. This is what happens when the exchange is code (i.e., a decentralised smart contract).

- Given the fact that (a) the node operators are decentralised and have no single location, (b) the team that deployed the contract may no longer exist or be known, (c) the effect of the contract is visible to any user and (d) that the contract deployer has no control over other parties choosing to use it this leads to the following outcome: the most centralised point in the chain is the end user and the business offering the web based interface to them in order to generate profit from a service. This may be an avenue for regulators to apply regulations in an otherwise decentralised space.

5. DeFi Lending
A large bulk of crypto lending is done through decentralised or semi-decentralised platforms. The BiS estimated that the total value locked in DeFi lending protocols peaked at $50 billion in early 2022[20]. As such, adding 'lending' to regulated activities without also appropriately regulating DeFi would achieve a limited outcome in terms of regulating lending and would not support the principle of a level playing field.

6. DeFi Governance Paradoxes
An additional point that we would highlight with regard to decentralised governance is the tension that can be seen in some DeFi categories such as Decentralised Insurance Protocols between token holders and users. In this example, while the former is often asked to share views, appraise, and vote on whether the claim is legitimate and users should thus be reimbursed, they have no interest in doing so since this would decrease the protocol's assets and thus the token's value.

The six challenges set out above are non-exhaustive examples as areas where further research and global cooperation should be encouraged to determine the appropriate, proportionate, and comprehensive regulatory solutions that may be needed.

3. Regulating DeFi – Leveraging existing processes and frameworks to create a holistic regulatory perimeter

Authorisation to conduct financially regulated activities

Overview
In order to conduct regulated financial activities, we recommend that DeFi organisations be supervised by the appropriate regulators of specific activities. This will create a more level playing field that is consistent even if the entity is not a regulated organisation and will also leverage the expertise of regulators to provide appropriate oversight of the activities being conducted. However, we would note that the below recommendations would primarily serve as 'regulatory hooks' and be most relevant for regulated financial services firms who are interacting with DeFi structures. One could argue that the DeFi 'purists' may aim to evade any form of centralisation to the largest extent possible and regulatory intervention and may need to rely on a self-governing model. If this occurs, there may be additional considerations for how a true DeFi structure would interact with the regulated financial services industry.

Recommendations
1. Provide DAOs with a legal status.
    a. Regulators should find a way to provide DAOs with a legal status, so that they could be subject to regulations and supervision.

2. Identify activities being conducted (e.g., lending etc.).

[20] https://www.bis.org/publ/bisbull57.pdf

a. Determining the nature of operations and taking into account the complexity of the firm's regulated activities, products and how the business is organised.

3. Determine location and jurisdiction.
    a. Financial institutions are required to have an identified place of business. Despite being decentralised, it is critical to know *where* financial products are being offered from and where financial activities are being conducted so that they can meet the regulatory requirements in that jurisdiction.
    b. Regulators are advised to provide clarity on cross-jurisdictional competences, covering in particular cases where investors, DeFi institutions and issuers are not located in the same country in a view to provide clarity on the applicable regime and hence avoid regulatory arbitrage stemming from the cross-jurisdictional nature of the structure[21].

4. Have some know personnel and visibility into key decision-making processes.
    a. Despite DeFi having varying levels of centralisation it is important for regulators to have oversight of the governance processes for financial activities being conducted. Existing governance regulations could be leveraged.
    b. Furthermore, it is important to have a point of contact. DeFi organisations will need to consider who is accountable for activities conducted and decisions made.

5. Final decision on authorisation to be made by the supervisory authority who regulates those specific activities.
    a. Taking into consideration the decentralised nature of DeFi activities, maybe different regulatory approaches should be considered too. For example, by offering voluntary compliance for those entities that cannot be recognised under the standard legal identity system (i.e., DAOs), or by introducing a role for regulators in that so-called "self-regulation" by way of validating industry codes or enhancing supervision intensity when necessary.

Choosing the appropriate accountability structure

Overview

Once activities have been identified, DeFi organisations must choose which of the following accountability structures they should adopt. Legal clarity on liability within DeFi is crucial and item 2(b) above also contributes to promoting robust principles.

Our suggestions are supported by research from the BIS. An article from their December 2021 Quarterly review states that all DeFi platforms have an element of centralisation, typically due to the presence of governance tokens. The article proposes that these governance structures mark a useful starting point for recognising DeFi platforms as legal entities.

Recommendations

1. Have an offshoot of a centralised and traditionally regulated financial institution.
    a. In this case the DeFi organisation would need to adhere to the appropriate regulatory requirements of its parent institution (much like a third country branch).

2. Leverage the approach of rule applicability from other entities that do not have legal personality (e.g., trusts).
    a. In this case the DeFi organisation should come under the appropriate activity-based regulation.

[21] Reference to the FSB Regulation, Supervision and Oversight of Crypto-Asset Activities and Market document can be made here - Recommendation 3: Cross-border cooperation, coordination, and information sharing.
Authorities should cooperate and coordinate with each other, both domestically and internationally, to foster efficient and effective communication, information sharing and consultation in order to support each other as appropriate in fulfilling their respective mandates and to encourage consistency of regulatory and supervisory outcomes." https://www.fsb.org/wp-content/uploads/P111022-3.pdf

3. Establish clear regulatory principles and rules that can guide the behaviour of DeFi participants (formal regulation).
4. In addition to formal regulation, encouraging self-regulation within the DeFi community and involving industry associations, practice guidelines, any forms of collection action that can help to promote accountability.
5. Develop an overarching governance body comprised of distributed ledger public infrastructures. This could possibly borrow some elements from the global governance of the internet, which constitutes a precedent success and relevance to other emerging digital networks.

Adopting a Risk Based Approach

Overview

Once an appropriate accountability structure is chosen, DeFi organisations must determine what risks need to be mitigated depending on the activities they conduct. They should also be able to evidence to the regulatory authorities how those risks are being considered in order to safeguard both retail and corporate consumers as well as limit negative impacts to financial stability.

AFME primarily represents a broad array of pan-EU global and regional banks. As such, AFME members are not using DeFi structures, however we would provide the below views for regulatory consideration based on industry observations of how these new structures function.

Recommendations

We would recommend that the risks related to businesses which interact with smart contracts should be reviewed for each smart contract interaction in terms of: Smart contract type / Economic / Oracle / Governance / Bridge. The risks are cumulative in nature when working out the total risk. AFME has set out considerations for these risks under the below categories:

1. Smart Contracts:
    a. Level of audit and quality of smart contract audit firm.
    b. Time stamp record of the snapshot of the codebase reviewed (in case of upgrades which introduce new vulnerabilities).
    c. Enhanced monitoring shortly after contracts are upgraded (including potentially reduced usage and liquidity requirements).

2. Governance:
    a. Type of governance. I.e., is it an External Owned Account (EOA), a multi sig or an on-chain DAO. (Recommend against single EOA as too vulnerable).
    b. Level of distribution of multi sigs (I.e., across different organisations and tech platforms).
    c. Level of DAO engagement (to avoid malicious proposals passing unexpectedly).
    d. All smart contract upgrades should have a time lock giving users time to evaluate between submission and execution.
    e. Monitoring of proposals submitted (to risk model potential impacts).

3. Economic:
    a. Evaluation of all tokens (Fungible Tokens and Non-Fungible Tokens) used in protocol for both liquidity and fees.

4. Oracle:
    a. Confirmation if it is on chain oracle (review of details of how the data feeds are aggregated (e.g., for prices does it include a TWAP (Time Weighted Average Price))) or if it is an off-chain oracle (review of risks related to the specific oracle such as chainlink number of nodes etc.).

5. Bridge:
    a. Type of bridge:
        i. Natively verified (most secure) – full nodes on each chain verify the transfer.
        ii. Locally verified – only the counterparties verify the transfer.

iii. Optimistically verified – assume at least one honest operator will challenge the transaction due to economic self-interest.

b. Externally verified (least secure) – relies on external verifiers who need to be trusted. We would also conclude by suggesting the following three best practices for DeFi structures:
   i. That a smart contract be audited by an authorised smart contract auditor;
   ii. That the degree of decentralisation established and verified when material changes in ownership happens; and
   iii. That assets on which DeFi protocol is being applied are also important to determine the risk (e.g., using a smart contract for a traditional financial services derivative).

Finally, we would also encourage that the analysis of decentralisation/regulatory hooks to consider if there is a direct beneficial owner of the smart contract (I.e. it acts as a business in Type 1 and 2a as discussed in our initial section where DeFi terms and categorisation is defined) or if it is instead a piece of software which is used by another organisation to provide a service (Where the business providing the service into a specific country, probably via a centralised website accessible in a country, is the beneficial owner as per Types 2b and 3).

In Type 1 and 2a classifications above it is the beneficial owner individual or groups controlling the private keys who may be subject to conflicts in terms of incentives.

In Type 2b there is no centralised authority and in Type 3 there may be no beneficial owner so where they provide a service it is more akin to the provision of open-source software and the organisations providing the interface for using the smart contract as a service to customers within the UK are acting as the beneficial owner. As most people will not have the technical ability or interest in accessing the blockchain directly the business profiting from offering a service using the smart contract software is best places to be regulated. Where this involves the provision of financial services, the corresponding activities should be brought into the regulatory perimeter. For activities operating outside of the perimeter, we recommend that regulators provide strong risk warnings.

Some smart contracts may also rely on bridges, some of those bridges introduce centralised trusted counterparts. For example, bridges can be to a real-world custodian where legal enforcement can be actioned or can be cross chain where a trusted counterpart acts on both chains (Like wBTC). Where bridges occur with centralised counterparties, they are an effective regulatory hook.

Creating A Level Playing Field – Consistent regulation despite varying levels of centralisation

Overview

Despite varying levels of centralization of decentralized finance (DeFi) offerings, there is the need for consistent regulation of those offerings. It is important to highlight the potential for individuals with significant control over governance tokens to dominate on-chain voting outcomes and the retention of emergency powers by some DeFi protocols. In this sense, centralised business models that market themselves as Defi to circumvent regulatory obligations should be subject to the same regulations as centralised organizations. Consequently, there is also the need for enforceable rules around DeFi activities parallels with algorithmic trading activities in traditional finance.

Recommendations

1. Regulators should be able to apply rules to individuals who maintain significant control or influence over a DeFi structure regardless of the level of decentralization:
   a. Develop clear criteria to determine what constitutes significant control or influence.
   b. Provide guidance to DeFi protocol teams on how to comply with regulatory obligations.
2. Regulators should establish enforceable rules around algorithmic trading systems and controls to manage the risks associated with DeFi activities:
   a. Establish clear standards for DeFi to adhere to in their algorithmic trading systems and controls.
   b. Require regular audits of DeFi protocol's algorithmic trading system and ensure compliance.
3. Regulators should require DeFi protocols/protocol teams to disclose the distribution of governance tokens and influence powers held by the team and investors:

a. Develop clear guidelines for DeFi protocols on how to disclose the distribution of governance tokens.
b. Monitor compliance with disclosure requirements through regular reporting & audits.

4. Regulators should collaborate with DeFi industry stakeholders to develop best practices for managing regulatory risks:
    a. Establish a Defi industry working group to develop and disseminate best practices.
    b. Regularly review and update best practices based on feedback from the industry stakeholders.
5. Regulators should take into account the current technological context, which is extremely dynamic, and aim to address the digital skills gap with specific reference to the skills necessary for financial intermediaries to identify significant phenomena of financial (or at least para-financial) innovation.

6. Conclusion

To conclude, we would reiterate that this is a crucial moment for the financial services industry and regulators as any potential exclusion of so-called "decentralised activities" would cause a gap in the application of emerging frameworks. This exclusion could create unintended risks to financial stability and potential knock-on impacts. To mitigate that risk, we would set out again our core principles and recommendations:

1. The importance of developing a foundational taxonomy classification mechanism for DeFi (and DeFi activities) as well as digital assets.
    a. We firmly encourage that a global taxonomy, which could eventually include definitions of DeFi and its associated activities, be developed through the establishment of a joint taskforce between industry and regulators. This global taxonomy should be comprehensive, but also have the ability to be reviewed and adapt with time and new innovations.
2. Further research and global cooperation should be encouraged to determine the appropriate, proportionate, and comprehensive regulatory solutions for the unique challenges posed by DeFi. We believe some of the key unique challenges of DeFi to consider are:
    a. The 'Counterparty' is a smart contract that is executed on all decentralised nodes with no 'home' jurisdiction or 'home' regulator;
    b. A smart contract will continue to exist even if initial uploading organisation disbands;
    c. Smart contract code is publicly viewable and easy to duplicate;
    d. Smart contracts can be used by other smart contracts in ways the original creator didn't intend;
    e. DeFi lending is crucial to address in order for there to be a truly level playing field; and
    f. DeFi governance paradoxes exist where token holders are disincentivised from good governance due to potential negative financial impact on token value.
3. It is crucial to leverage existing processes and frameworks to create a holistic regulatory perimeter. Our paper includes recommendations for:
    a. Requiring authorisation prior to conducting financially regulated activities through:
        i. Providing DAOs with a legal status
        ii. Identification of activities being conducted (e.g., lending etc.);
        iii. Location and jurisdiction;
        iv. Personnel and decision-making processes; and
        v. Final decision on authorisation being made by the supervisory authority who regulates those specific activities.
    b. The importance of choosing an appropriate accountability structure which could be through:
        i. An offshoot of a centralised and traditionally regulated financial institution;
        ii. Leveraging the approach of rule applicability from other entities that do not have legal personality (e.g., trusts)

iii. Creating a legal figure for DAOs incorporation, so that this legal figure can be held responsible for legal obligations and therefore, be required to comply with the requirements laid out in MiCA.

iv. Establishing clear regulatory principles and rules that can guide the behaviour of DeFi participants (formal regulation) and;

v. In addition to formal regulation, encouraging self-regulation within the DeFi community and involving industry associations, practice guidelines, any forms of collection action that can help to promote accountability.

vi. Developing an overarching governance body comprised of distributed ledger public infrastructures. This could possibly borrow some elements from the global governance of the internet, which constitutes a precedent success.[22]

c. An initial industry view on establishing a risk-based approach to DeFi.

i. We would recommend that the risks related to businesses which interact with smart contracts should be reviewed for each smart contract interaction in terms of: Smart contract type / Economic / Oracle / Governance / Bridge. The risks are cumulative in nature when working out the total risk.

d. Support for a 'Level Playing Field' and working towards consistent regulation despite varying levels of centralisation. Our regulatory recommendations are as follows:

i. Regulators should be able to apply rules to individuals who maintain significant control or influence over a DeFi structure regardless of the level of decentralization.

ii. Regulators should establish enforceable rules around algorithmic trading systems and controls to manage the risks associated with DeFi activities.

iii. Regulators should require DeFi protocols/protocol teams to disclose the distribution of governance tokens and influence powers held by the team and investors.

iv. Regulators should collaborate with DeFi industry stakeholders to develop best practices for managing regulatory risks.

v. Regulators should take into account the current technological context, which is extremely dynamic, and aim to address the digital skills gap with specific reference to the technical skills necessary for financial intermediaries to identify and participate in significant phenomena of financial innovation.

AFME continues to be supportive of the development of a thriving digital economy within a clear legal and regulatory framework and hopes this paper will encourage further analysis and consideration of these foundational principles as the EU continues its work on decentralised finance and the governance of digital assets more broadly.

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About AFME

The Association for Financial Markets in Europe (AFME) is the voice of all Europe's wholesale financial markets, providing expertise across a broad range of regulatory and capital markets issues. AFME represent the leading global and European banks and other significant capital market players. AFME advocates for deep and integrated European capital markets which serve the needs of companies and investors, supporting economic growth and benefiting society. AFME aims to act as a bridge between market participants and policy makers across Europe, drawing on our strong and long-standing relationships, our technical knowledge and fact-based work. For more information, visit https://www.afme.eu/

[22] https://direct.mit.edu/books/oa-monograph/4936/Researching-Internet-GovernanceMethods-Frameworks

Annex 1: DeFi by the Numbers

Crypto and DeFi in numbers – the below is an extract from the AFME CMU Key Performance Indicators Report Nov 22[23]

The use of crypto assets and DLT technology in non-regulated financial services activities has experienced a phase of exponential growth in the last years. Specialised market participants willing to tolerate the underlying risks of crypto activities can access a range of services such as savings, lending, trading, among many others.

These activities are commonly undertaken via Centralised exchanges (CeFi) although in recent years a significant portion has been undertaken via Decentralised Finance (DeFi) protocols. The use of DLT in the regulated financial sector has also grown predominantly in areas such as issuance of digital assets and asset tokenisation (e.g., DLT-form bonds), custody, and settlement of securities. Data from Chainalysis suggests that Western, Northern and Central Europe (WNCE) is the world's largest crypto economy, with the United Kingdom being Europe's biggest DeFi district. This highlights the importance of the evolution of DLT adoption for Europe and for financial consumers.[24]

Lending and deposits: Centralised and decentralised

Centralised lending intermediation

Centralised crypto lending activities operate under a custodial framework, where crypto platforms manage deposits on a centralised platform which stores financial records on a wallet in the form of tokens. Depositors earn interest on their resources while the platform intermediates and invests the deposits through lending origination.

Data is scarce on deposits and lending volumes intermediated by centralised platforms (CeFi). As CeFi platforms store deposits and supply lending, sound balance sheet asset liability management is crucial to safeguard appropriate management of risks. Most recently, centralised crypto platforms were subject to relevant financial distress which led them to pause withdrawals, swap, and transfers between accounts, or breaking the pegs of widely used stablecoins.

Bankruptcies of several large CeFi platforms (beginning with Celsius) in the aftermath of the collapse of Terra/Luna highlight the benefit that would be brought from the participation of banks applying capital, liquidity, risk management and other prudential regulations and supervisory oversight to the crypto asset sector.

The decentralised model (DeFi)

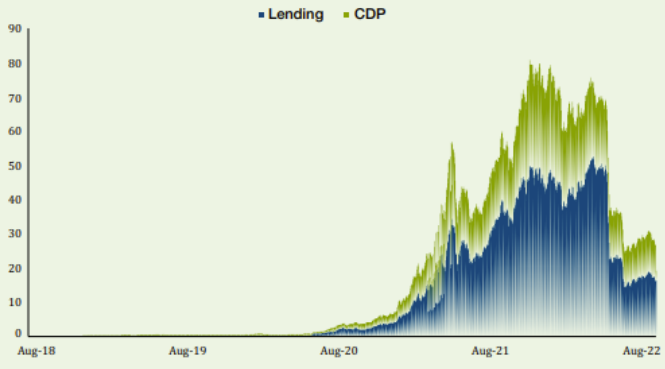
Lending via DeFi protocols operates under a peer-to-peer model. Depositors and lenders maintain ownership of their tokens without a custodial centralised intermediation of a platform but structured with the use of governance tokens which are specific to each DeFi protocol. Lenders earn interest and borrowers pay interest with the use of automated smart contracts via a DLT platform.

[23] https://www.afme.eu/Portals/0/DispatchFeaturedImages/AFME%20CMU%20Key%20Performance%20Indicators%20Report%20Nov%2022.pdf?ver=2022-11-16-133135-940

[24] The proportions are constructed based on website traffic by geography, where VPN relocation may inflate Europe's global participation. The Chainalysis indicator is based on estimates of 1) on-chain DeFi value received, 2) on-chain number of DeFi deposits, 3) on-chain retail DeFi value received.

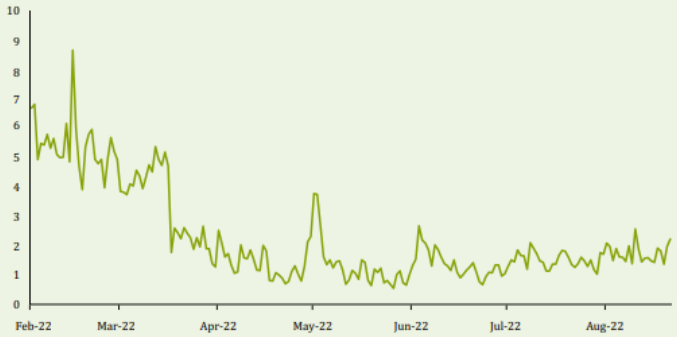
Industry data suggests that total assets (i.e., total value locked) in DeFi lending and collateralised debt positions reached $80bn globally in November 2021, followed by a sharp decline to $30bn as of August 2022. Industry data also suggests that yields on DeFi deposits have declined from 6% in February 2022 to 2% in August 2022.

6.10: **Total assets in DeFi lending and collateralised debt positions ($bn)**



Source: DeFi Lllama. Total assets refers to total value locked

6.11: **Evolution of deposit rates in DeFi protocols**



Source: DeFi Lllama

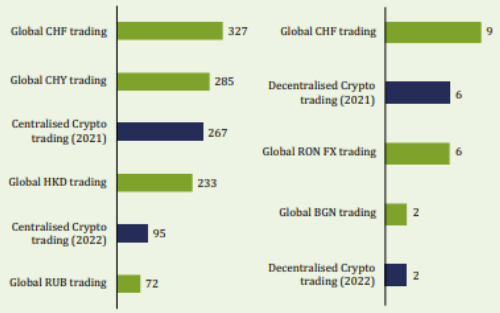
Trading and derivatives

The size of crypto trading has grown significantly in value over the last decade. Crypto trading is predominantly traded via centralised platforms, although the use of decentralised protocols has grown significantly in recent years.

During late 2021, the amount of crypto trading undertaken via centralised platforms reached $267bn on average per day, which is above the average daily of major currencies like the HKD ($233bn) while DeFi trading reached $6bn in late 2021 or about the same amount of global Romanian (RON) trading.

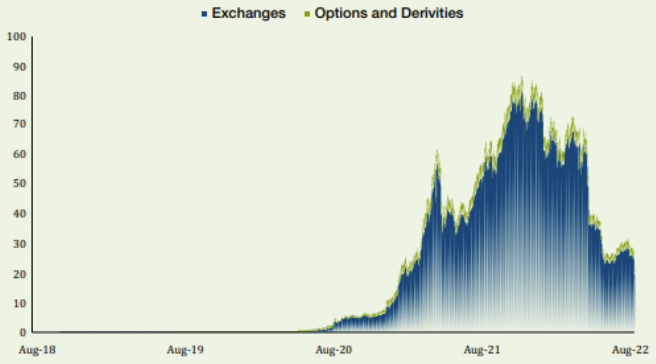
Most recently, following the early-2022 decline in crypto market valuations, centralised crypto trading declined in average turnover to $95bn per day, comparable to currencies like the Russian ruble ($72bn per day). DeFi trading declined accordingly to $2bn per day, around the same amount of Global Bulgarian lev daily trading.

6.12: **Average daily trading of selected currencies compared to DeFi and CeFi crypto trading ($bn)**



Source: DeFi prime, BIS

6.13: **DeFi total assets in trading, options and derivatives**



Source: DeFi Lllama. Total assets refers to total value locked

Going forward, the challenge for regulators is to bring a balance where financial consumers can benefit from new forms of technology, while minimising any regulatory arbitrage following the principle of same activity same risk same rules between DeFi, CeFi and the regulated financial sector.