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What is DeFi?

'DeFi' is short for Decentralised Finance and is a broad term that has been adopted by a variety of approaches to replicate anything occurring in the traditional

finance world but using cryptocurrency and occurring on a decentralised ledger (or blockchain). The

decentralised part means that each participant on either side of a trade or transaction can interact directly from their computer to the other participant's computer. No intermediary is required and every part of the transaction is logged on a blockchain system, which is itself stored on many computers. In contrast, the traditional financial system operates on a centralised system where the databases of transactions are managed by a company like a bank, an exchange or payment processor. DeFi systems do not require users to sign up or provide identity, they just need a wallet to host the cryptocurrency being transacted.

Which industries is DeFi trying to replicate?

DeFi applications include

- Crypto deposits and lending (like banks)
- Exchanges (like NYSE, LSE)
- Automated asset managers (like structured products or robo advisors)
- Stablecoin management (like a central bank managing a currency peg)

In a nutshell, DeFi is trying to replicate any type of financial contract using cryptocurrency and a smart contract. DeFi exchanges and lending are the two largest categories with crypto deposited on the platforms. There are however

overlaps such as yield aggregators which could invest a user's crypto on lending platforms on behalf of them.

3. What opportunities and risks does DeFi pose to the established financial sector?

DeFi is a window into the demands for financial services innovation. Established financial sector incumbents can benefit from understanding which DeFi offerings are getting the most attention and why – are they enabling a service that incumbents can apply and

leverage? The risk is that DeFi pulls flows from incumbents, but without regulatory

approvals we see this risk as low as lack of regulation will keep a lid on institutional participation.

As DeFi is constantly evolving, and very nascent as a financial protocol, the full extent of opportunities and risks is not yet clear, in our view. Every week we hear about a new protocol, protocol update or new decentralised application, so it is hard to know how different the DeFi landscape could look in a year's time. The landscape may also significantly change and evolve once we have central bank digital currencies (CBDCs) as potential underlying assets for the DeFi protocols beyond cryptos.

The line between the banking sector and the crypto industry will continue to blur, with crypto companies offering banking products and some banks looking to add

the technologies that underlie crypto into their business models. Regulatory changes may eventually limit which DeFi products can be offered by unregistered entities that do not adhere to KYC/AML standards. That said, here are the main services currently:

Bank lending and borrowing DeFi with a pure decentralised system where no users need to be permissioned to use the system is unlikely to fully replace the existing bank lending and borrowing system for two main reasons.

1) Financial markets are regulated in order to avoid market manipulation and financial crime, yet regulators are finding it difficult to regulate DeFi given there is no central authority to regulate and users are anonymous.

2) Traditional banks are involved with determining the credit worthiness of borrowers and setting related interest rates. Today, DeFi lenders don't know the credit worthiness of the borrowers so to manage market interest rates and to mitigate risk of default, borrowers typically need to deposit cryptocurrency of equal or higher value than the crypto they are borrowing. The majority of DeFi lending is thus over-collateralised, with

rates set by supply and demand. As a result, unlike the traditional banking system, money creation is not done in DeFi in its current form, which means it will be harder for DeFi to be seen as an alternative to the current fractional reserve banking approach.

We should mention that there are some protocols (for example Teller, TrustToken and Maple Finance) that claim they do uncollateralised financing in DeFi, but we think all of these have either some element of centralisation, making it not very "DeFi" but rather

more "CeFi" (for example they ask for a physical address, and bank account statements) or overcollateralisation (for example, TrustToken states that before giving a loan they check that the borrower has available liquidity in the form of unencumbered liquid assets and collateral coverage that may range from 10.0x to 15.0x the total loan amount)

Permissionless DeFi protocols, where anyone can sign up without identity, will continue to struggle to replace the traditional banking business model as lending may have to stay highly collateralised. Note that some may argue this was one of the reasons Bitcoin

emerged, to limit the money supply growth. Permissioned DeFi protocols are still relatively new but have the potential to grow quickly as institutional investors are attracted to the relatively higher yields available relative to other financial products like government bonds but require an element of understanding of the credit risk associated with the loans. KYC checks are also done, which may make trades using these types of protocols more palatable as DeFi

regulation gets more defined. Yet we note that these permissioned protocols have a

layer of centralisation, as they are dependant on a central agent carrying out KYC, hence they look less "DeFi" to us. Swaps, securities lending and other collateralised lending Rather than something similar to traditional lending, for now we see these type of loans

as more akin to cross-currency swaps, because the DeFi platform is lending one crypto against another. We could also consider these loans to be more like securities lending, as investors are pledging one crypto for access to a different crypto. For this, we need to

think about cryptos as assets rather than currencies. At present we don't see DeFi technology impacting the incumbent industries.

We can see how DeFi lending protocols could be applied to other forms of collateralised lending that have multiple trigger points for borrowers and lenders. For example, mortgages is an asset class that has various trigger points, including LTV, borrower DTI, mortgage insurance, title, appraisal, etc. Encoding all the relevant borrower details, valuation details of the property, and, most importantly, that the mortgage is enforceable could make DeFi technology useful here. The challenge however is that all parties to this contract would need to adopt the protocol, including the legal system (i.e., a contract may say that a person owns a house, only the police could enforce an eviction), and at this stage it seems more likely to us that mortgages evolve to a more digitalised form, rather than experience a complete

change of the infrastructure on which they run as would be the case if using DeFi.

Exchanges and asset managers

For exchanges and asset managers, DeFi is potentially interesting and disruptive, yet, we think there would need to be changes in law allowing for equity and bond representations to be made on distributed ledger technology (DLT) before the decentralised exchanges (DEXs) and DLT AMs technology can go mainstream.

4. Can crypto applications be truly decentralised?

CeFi vs DeFi

No, we don't think the largest cryptocurrency applications that call themselves DeFi today will be truly and fully decentralised in the future.

The name "DeFi" was created in 2018 as it was similar to the word "defy". This is important as the crypto community wants to take share from incumbent payments, banking and asset trading platforms. DeFi applications cut down the time for an intermediary to approve a transaction but are under regulatory scrutiny due to anonymity. As DeFi applications aim to attract more users and investment, especially from institutions, we think that regulations will force these DeFi applications to have some elements of centralisation, such as checks on identification of users for

money laundering regulation (the BIS recently wrote about this too). For example the DeFi crypto lender Aave introduced Aave Arc, which permissioned participants, mostly financial crypto institutions, and applied KYC and AML compliance standards. This isn't truly DeFi, possibly it can be described as centralised lending using decentralised blockchains to settle transactions and automated market making.

Thousands of DeFi-related crypto applications have been created over recent years but as with many industries, some applications are more popular than others and they in turn attract more users. For example platforms like Open Sea for NFT trading and

MetaMask, a wallet to manage DeFi crypto transactions, dominate in their particular area. If the code associated with the application has vulnerabilities, a large number of crypto users are affected, which was the case recently with OpenSea. Cryptocurrency is a way for anyone to transact wealth, even if they do not have access to traditional financial services. The DeFi ecosystem relies on the MetaMask wallet application, which

recently applied restrictions for users in some countries. In both these examples, the underlying blockchain handling transactions may be decentralised but the application that uses it is not, it is in fact centralised. Overall, an element of centralisation brings efficiencies as we have seen with the crypto market so far. The large majority of crypto trading on exchanges occurs on centralised

exchanges, with decentralised exchanges participating in only ~10% of crypto exchange trading volumes.

We cannot however ignore one of the reasons why DeFi grew - anyone could transact and trade crypto without any intermediary and without regulatory burdens. DAOs which are decentralised autonomous organisations are groups or platforms that allow members to vote on the future of the DAO's application or goals (more details here). These are decentralised in terms of some decision making but come with risks of centralisation if one party owns a large number of voting tokens and thus can lead to theft of assets or skewing the market place in their favour.

Overall, the trading part is still going to be settled on a decentralised blockchain but the application layer on top of the blockchain is not necessarily decentralised.

5. How can investors get exposure to DeFi?

There are a few main ways for investors to gain exposure:

- 1) investing in the DeFi project's related token or cryptocurrency (e.g. Exhibit 7)
- 2) investing in the cryptocurrency associated with the blockchain that runs the DeFi applications (e.g. Exhibit 16)
- 3) receive interest-like income through yield farming, liquidity mining or lending on DeFi platforms

4) invest in a fund or ETF product that has exposure to DeFi (most buy the underlying tokens).

Today, most DeFi projects still

operate on Ethereum. We have found that DeFi user growth has generally tracked the growth of Ether (ETH) prices. More and more DeFi applications are being developed to operate on other blockchains that have lower transaction fees than Ethereum, such as

Terra, Binance/BNB chain, Polygon and Avalanche.

What is yield farming?

A user deposits cryptocurrency on the platform, locking it up in a smart contract and receives rewards for doing so. The reward comes from the DeFi protocol lending out the crypto. Users can earn fixed or variable interest.

What is liquidity mining?

Users contribute cryptocurrency to a liquidity pool. Often they deposit an equal value of two cryptocurrencies that are part of a trading pair, for example DAI and USDC. These pools are where traders on DeFi exchanges can trade, a portion of the transaction fee is then given to those who contribute liquidity to the

cryptocurrency pool. The fee received is typically set by the DeFi protocol and can vary from time to time.

6. Why have interest rates on crypto-dollar deposits been so much above standard (fiat) USD deposits?

Centralised and decentralised crypto lending platforms have offered relatively high interest rates to attract investment and new users. The high interest rates could be justified in a crypto bull market as the borrowers were mostly crypto traders and crypto companies themselves who were unable to borrow from the traditional banking system.

The borrowers were willing to pay 10% interest as they assumed they could make a higher return investing it in other cryptocurrencies or crypto products. In January 2022, a centralised crypto lender called BlockFi was offering 9.5% annualised interest on deposits of USDC. Regulators have started to push back on some centralised lenders, such as BlockFi which was fined by the SEC, and they will no longer offer high interest deposit products to US residents, so the interest rates listed in Exhibit 8 are not available to everyone. The interest rates offered for stablecoins (or crypto-dollars) have fallen during the recent crypto bear market as demand for borrowing has fallen. The interest rates for asset backed stablecoins are unlikely to converge to those in the USD banking system anytime soon because the issuers and related credit risks are very different.

Note that we have focussed on interest rates for stablecoins but the DeFiecosystem has created a market for income/interest to be offered for depositing any new cryptocurrency created. Yield farming aggregator websites show that some crypto

liquidity pools (where pairs of cryptos are traded) claim to offer much higher rates,

some over 100% APR, but these are to participate in liquidity trading pools for small and new cryptos. The income returned here could be in the new crypto, which itself is at risk of volatile price action, in contrast to stablecoins.

7. How can regulation change this market?

At this stage regulation is mostly focusing on the broader crypto and stablecoin markets rather than specifically on DeFi, with many countries working on a framework to regulate cryptocurrencies with the topics of consumer protection, management of systemic risks and AML concerns being common themes, rather than outright banning crypto exposure altogether. Recent restrictions introduced on cross border transactions could accelerate the regulator action relating to DeFi and include DeFi more explicitly into their crypto regulations. So far, for DeFi specifically, the US has made references to regulating DeFi in some of the recently published papers (see [here](#) and [here](#)), whereas in Europe we would

expect any DeFi regulation to be part of MiCA (Markets in Cryptoassets) regulation, although there is no explicit reference at the moment.

In general, we think regulation of DeFi will be difficult given the lack of a central entity to regulate, a key stumbling block for the growth of DeFi in its current form. If regulators want to manage the flow of cryptocurrencies and manage who can use them, the only avenue is through regulating intermediaries like exchanges or custodians. We expect centralised exchanges to have to check the identity of their users, like banks do, and adhere to know your customer (KYC) and anti-money laundering (AML) regulation.

It is harder to do that on DeFi platforms as the identity is not known. Estonia may be the only country so far that has prevented decentralised exchanges from operating there as it has asked all exchange-like entities to register and conduct identity/AML checks. Overall we are likely to see DeFi platforms incorporate more centralised components to adhere to payment regulations.

8. Are there any traditional finance companies investing in DeFi?

Most banks have yet to get involved in DeFi given how nascent and unregulated this technology is. In Europe we would point to SocGen and ING though.

Societe Generale has proposed a \$20M DAI loan in exchange for bond tokens.

CoinTelegraph reported on 30 September 2021 that the digital assets division of Societe Generale (Forge) has submitted a proposal to the governance forums of

decentralised finance platform MakerDAO to provide covered bond tokens (obligations de financement de l'habitat or OFH tokens) as collateral for a loan of the DAI stablecoin. We note that while the proposal is publicly available on the MakerDAO forums, Societe Generale has not commented on this report. If confirmed, this would mark the first major collaboration between a traditional bank and a DeFi protocol, and would bridge the gap between centralised and decentralised finance.

Elsewhere, ING has been reportedly looking into DeFi, with their blockchain lead Mariana Gomez de la Villa commenting at a Coindesk's Consensus 2021 conference in

May 2021 that "DeFi has properties that could help a bank like ING. For example, to

learn about the composability of those items, how they are deploying modular types of

components, and so, how we can be more flexible in our infrastructure" (as per article

here). The bank has published a white paper studying lessons that can be learned from

DeFi (here). Finally, according to some press outlets, the bank mentioned at the

Singapore Fintech Festival that the bank is working on a trial of its decentralised finance,

or DeFi, peer-to-peer lending protocol with the Netherlands Authority for the Financial

Markets (here), although a spokesperson for ING stated later that no concrete proposition had been developed for the regulator yet.

9. How do DeFi protocols actually make money?

We think there are two ways in which a protocol makes money:

1. by appreciation of the governance token - these are the tokens that allow the owners

to vote in any decision to change the protocol (an example of such a governance token

is the AAVE token): the more flows a protocol sees, the higher the governance token

value.

2. through transaction fees - in our understanding the "reserve rate" (which for example comes from the bid offer between the borrowing and the lending rate in a lending and borrowing protocol) is somewhat similar to what we would normally categorise as revenues. Part of the bid-offer spread between the borrow-lend rate (for example a

user can deposit USDC at 3.19% and borrow at 3.85%) goes into a "reserve treasury", and the treasury can decide what to do with this, for example developing new features, investing further in the platform. DEXs instead in our understanding make money via

transaction fees, which is a percentage off every trade.

We are writing about DeFi given its exponential growth (we count over 1,300 DeFi protocols, total value locked at over \$200bn, up over 300x from \$600mn in Jan 2020, using Defi Llama data), and suggestions of share gain from incumbents.

As not all crypto businesses are DeFi (for example Coinbase is a centralised crypto

exchange, while Uniswap is a decentralised crypto exchange), we want to specify that in this note we will focus on DeFi use cases only.