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WHAT IS DECENTRALIZED FINANCE?

Decentralized finance ("DeFi") is an emergent asset field of blockchain technology that aims to deliver financial products and services on a decentralized, permissionless, and trustless basis.

The aim of this paper is to examine the growth of the industry and evaluate how investors are leveraging these platforms to both generate yield and speculate.



1 - DEFI IS DECENTRALIZED

The growth of dApps (applications or contracts built on top of decentralized protocols) accelerated on the back of the Ethereum protocol over the last few years. These dApps enable a wide variety of services such as minting tokens (e.g., stablecoins, digital representations of ownership, or security), the lending / borrowing of 'money', trading, and even registering your business!

Decentralization is a key differentiator and is typically qualified by the lack of a centralized and/or humandriven set of process and procedures. Instead, the rules of the platform are determined by algorithms programmed into smart contracts. Updates can be made to these algorithms through a decentralized governance process that involves voting on proposals with governance tokens or executing hard forks to prevent coup attempts.

2 - DEFI IS PERMISSIONLESS

dApps are designed to improve access to financial services. A critical component of this is the lack of a centralized gatekeeper. dApps are intended for use on a global basis with few barriers to entry.

These products are designed such that anyone with access to the internet can "plug-in" to these products in a seamless manner. Further, since users can interface directly with smart contracts, anyone can create dApps leveraging the underlying protocol and transact through their wallets.

3 - DEFI IS TRUSTLESS

Blockchain has been referred to as the completion phase of the internet (Web 3.0) - providing the critical layer of trust to facilitate trustless transactions between any two persons around the world.

Blockchain can do this essentially by distributing the functions of 'verification' traditionally tasked through centralized banks or other financial institutions.

By distributing transactional verification, two parties can reduce the reliance on each other.



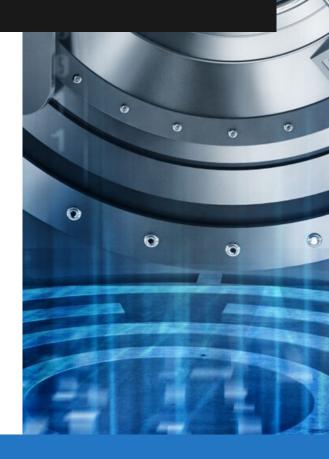
"BY DISTRIBUTING TRANSACTIONAL VERIFICATION, TWO PARTIES CAN REDUCE THE RELIANCE ON EACH OTHER."

By incentivizing other parties to be good actors through various consensus mechanisms (such as "proof of work" or "proof of stake"), costs to execute a transaction are exponentially reduced – in terms of both the time and resources required.

Essential to this trust factor is the transparency in code that underpins smart contracts.

In fact, blockchain's ability to store transactions and to provide an immutable record allows the participants to verify and audit transactions in principle almost with no cost.

Anyone with knowledge of blockchain can examine a particular smart contract's code and audit for any bugs.





Key drivers for such a monumental growth relate to solving the moral hazards associated with centralized financial systems. Some of the fundamental factors driving success of the industry include:

ACCESS

Decentralized protocols provide a monetary system as a service that anyone around the world can tap into without significant barriers to entry. Products like credit, yield generation, and even insurance are available with internet access as the only gatekeeping factor.

FUNGIBILITY

Current dApps can be integrated in both permissioned systems (necessitated in situations where privacy is important, or regulations are strict) and flexible enough to bootstrap financial services platforms around the world and across different blockchains such as Ethereum, Binance Smart Chain, Huobi, etc.

SPEED

The ability to seamlessly transfer assets from one person to another around the world (in mere seconds) at a low cost is a feat that traditional financial systems cannot efficiently accomplish with current infrastructure. Even wires can be typically delayed up to 5-7 business days if a transfer requires multiple leaps on various transaction networks, with no promise of success.

TRADING

Decentralized systems enable greater liquidity without stringent regulation to monitor and structure how and when trades can occur. If there are markets people are interested in, platforms can be created to facilitate them. Further, automated market makers enable new projects and arbitrage traders to align on providing liquidity.

MILESTONES & MARKET GROWTH

The rise of DeFi can largely be traced back to the release of the Maker DAO Dai contract in late 2017. There was a significant need for a decentralized stablecoin and the maker contract presented a feasible solution with Dai - an overcollateralized stablecoin.

However, what is most important to understand regarding MakerDAO and Dai is the impact this project had on crypto as a whole acting as a major catalyst for DeFi. Maker and Dai inspired a new wave of more sophisticated and innovative protocols such as Synthetix, Aave, and Uniswap.

Although MakerDAO released Dai in late 2017, it was not until early summer of 2020, or "DeFi summer" as it is now known, that DeFi began to gain traction again. Projects that began development in the depths of the bear market were finally coming to fruition and the money began to follow. In a span of about half a year, DeFi TVL has risen from \$1B to \$40B.

Total Value Locked (USD) in DeFi



The growth in the chart above was largely kickstarted by Compound Finance's liquidity mining rewards program. The Compound protocol pioneered the concept of liquidity bootstrapping through rewarding LPs with governance tokens. Additionally, it has inspired more sophisticated governance token models with mechanisms to return protocol fee revenue back to token holders.





MILESTONES & MARKET GROWTH

CONTINUED

Going forward, our thesis is that DeFi will continue its meteoric growth. Protocols are continuing to show that there is real demand and a product market fit for DeFi. Interestingly, we are starting to see traditional financial analysis being applied to crypto protocols as well with analysts beginning to apply methods like traditional DCF valuations or multiples-based analyses. These valuations are demonstrating that many crypto protocols can be incredibly undervalued.

For example, take the quoted Market Cap to Total Value Locked multiple that can be used to compare various platforms. One stark example of valuation multiples being reflected in trading behavior can be observed between Ethereum (ETH) versus Binance Smart Chain (BSC) based tokens.

Token Valuations

Project	Mkt Val / TVL	Platform
AAVE	1.1x	Ethereum
Uniswap	1.5x	Ethereum
Yearn	2.4x	Ethereum
Pancake Swap	0.5x	BSC
Beefy Finance	0.5x	BSC
Venus	0.2x	BSC

^{*}Data as of Feb 8, 2021

Differences in the valuation between Ethereum and BSC multiples in this case could be related to the depth of ETH markets, longer history, deeper liquidity pools, more institutional support, etc.

Furthermore, proof-of-stake tokens leverage yield to secure a certain blockchain or incentivize users. For example, in the current transition to ETH 2.0, users can stake their ETH in exchange for an interest (often volatile but can range between 5% to 17% for ETH).

Various tokens can leverage yield to optimize and economic system, for example certain tokens with high inflation rates will provide a high APR to offset planned token devaluation.

In balancing inflation with yield, these tokens can be extrapolated into a discounted cash flow analysis, where an investor can analyze future yield and use cases for a particular blockchain and model out their benchmark discount rate (i.e., an IRR analysis).





LIQUIDITY MINING & YIELD FARMING

TECHNOLOGIES FOR INVESTMENT OPPORTUNITIES.

ARBITRAGE

INSURANCE

Given the nascency of the industry, many of these strategies contain significant risk (detailed in the section titled "Risk Factors" below) and require sophisticated technical knowledge to execute.

LIQUIDTY MINING & YIELD FARMING

Liquidity mining and yield farming enable holders of digital assets to generate yield by earning rewards through a particular protocol.

The processes entail lending one's cryptocurrency and locking up the assets in a smart contract to generate additional return on a cryptocurrency investment (traditionally, these strategies have been built on Ethereum, but recently we have witnessed the growth of alternative platforms like the Binance Smart Chain platform).

STEP 1.

Add funds to a smart contract, typically referred to as liquidity pools, which underlies lending markets or decentralized exchanges. Liquidity pools are smart contracts that have aggregated funds from various lenders to facilitate lend, borrow, and trading on a DeFi platform.

LIQUIDITY MINING & YIELD FARMING

STRATEGY IMPLEMENTATION

TYPICALLY, THE YIELD FARMING PROCESS IS EXECUTED AS FOLLOWS:

EXAMPLE: IF YOU ARE LONG SETH, YOU CAN DEPOSIT YOUR SETH IN A DECENTRALIZED PROTOCOL LIKE AAVE.

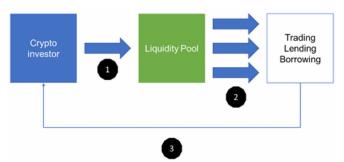
STEP 2.

Receive a piece of the fees generated from the DeFi platform (referred to as 'rewards'). In a lending model, lenders that provide liquidity are paid an interest rate. In decentralized exchange models, users can trade against the pools of aggregated liquidity, and liquidity providers receive a pro rata portion of the trading fees as a result.

STEP 3.

Platforms require deep liquidity to function properly and scale. As such, many platforms are currently incentivizing users to provide liquidity through 'incentive rewards'. In the case of lending markets, such as Compound, users who lend or borrow also receive 1-5% of the amount paid in Compounds' native governance token COMP. In the case of liquidity pools, liquidity providers can stake their LP tokens (essentially a depository receipt) and receive additional governance tokens as well. These governance tokens offset borrowing costs, provide additional yield, and allow for more complex composable strategies.

EXAMPLE: ONCE THE ETH HAS BEEN SENT TO THE COMPOUND PLATFORM, THE LENDER WILL RECEIVE COMP TOKENS AS A REWARD FOR CONTRIBUTING LIQUIDITY. BELOW IS AN EXAMPLE VISUAL OF THE LIQUIDITY MINING PROCESS.



- 1. CRYPTO HOLDER DEPOSITS ASSETS INTO A LIQUIDITY POOL.
- 2. THE LIQUIDITY POOL PROVIDES THE ASSETS FOR TRADING, LENDING, AND BORROWING VIA THE DEFI PLATFORM.
- 3. AS A RESULT OF THE SERVICES, THE CRYPTO HOLDER SHARES IN THE FEES FOR SERVICES PERFORMED IN STEP #2 AND ADDITIONAL REWARDS IF APPLICABLE.

STEP 4.

Deposit reward tokens received in step #2 into other liquidity pools for additional yield. Yield can be optimized by analyzing a variety of platforms to improve diversification or adjust your risk. This process of financial engineering across various DeFi platforms to maximize return is known as yield farming. Projects such as Yearn Finance (\$YFI) have emerged to automate management of the yield farming process with vaults.

EXAMPLE: USER DEPOSITS AAVE TOKENS RECEIVED FROM CONTRIBUTING ETH INTO ANOTHER SMART CONTRACT PROVIDING LIQUIDITY FOR AAVE.

LIQUIDITY MINING & YIELD FARMING

KEY RISK FACTORS

THE FOLLOWING RISK FACTORS ARE UNIQUE AT THE PROTOCOL LAYER:

The risk factors below are not meant to be comprehensive; however, they represent key weaknesses in DeFi infrastructure that have been or can be taken advantage of. We expect more sophisticated techniques to be deployed in the future as these platforms continue to blossom.

It is necessary to both monitor and analyze positions before entry, during the holding period, and after an exit to maintain a sustainable allocation to DeFi.

SMART CONTRACT FUNCTIONALITY RISK

In short, this is the ability for smart contracts to function as expected or as marketed to the community. Added complexity in the underlying code creates opportunities for bad actors to take advantage of errors and bugs to profit. Given the decentralized nature of DeFi transactions, it is impossible to reverse a transaction once it is memorialized on the blockchain. Such contract failure risk can be mitigated by bringing in third party audit firms (such as Consensys or CoinFabrik, even PwC now offers smart contract audit services). Further, these platforms are constantly evolving; understanding migration risk for token upgrades are essential to avoid a loss of assets (e.g., pausing smart contracts on Ocean token).

EXTERNAL CALL FUNCTION RISK

An attack vector focused on a smart contract's interaction with an external source of information, such as a pricing oracle. Pricing oracles, specifically, can be manipulated by dumping and are susceptible to low levels of liquidity.

'RUN-ON-THE-PLATFORM' RISK

Platform users depend on sufficient liquidity and interest rate pricing to ensure platforms have enough tokens to meet demand. For example, a utilization rate, much like a reserve requirement for banks, determines how much liquidity a platform (defined as the total percentage of staked assets that have been lent out) can bear before being rendered illiquid.

FRONTRUNNING RISK

Inefficiencies in the Ethereum network have made platforms built on ETH susceptible to frontrunning attacks where algorithmic arbitrage traders can see your transaction in the meme-pool and frontrun it by sending an ETH transaction with a higher gas fee, so you pay a higher price for the coin. Like traditional markets where a rogue trader may invest prior to knowledge of a significantly larger allocation about to hit the market, attackers can nullify, modify, or even manipulate transactions to their benefit. Platforms have implemented policies to mitigate this risk by establishing policies such as FIFO, third party signers, randomized mining, and transaction chaining to mitigate risks with frontrunning.



HUMAN RISK

Access to DeFi platforms is overly complex, certainly more than opening a bank account and managing your passwords. Losing your private keys, falling victim to a phishing attack, or falling victim to a SIM swap attack could cause you to lose access to your digital assets. Thoughtful process and procedures are required to store assets.

REGULATORY RISK

KYC, AML, and taxes are critical regulatory hurdles that certain jurisdictions will need to deal with for the future of DeFi. While we see massive growth in both developed and emerging markets, regulation can have a chilling effect on capital allocation. In the US, the departing Comptroller of Currency Brian Brooks noted "our current bank regulations exist mainly to prevent human failings..." and that "in the absence of federal regulatory clarity, US states rush to fill the void and create a patchwork of inconsistent rules that impede the orderly development of a national market."

When you look at the global landscape, inconsistency in regulation could either cripple growth of the industry and accelerate conflict between sovereign states and the enterprises that operate within their jurisdictions. Another key factor in regulatory risk is to determine the level of decentralization in any platform. Platforms like Compound still enable holders of an admin key to access digital assets allocated to smart contracts. The degree of centralization can also influence interest rates, liquidity, and manipulation.

OPAQUENESS RISK

Having great insight beyond the code is important when determining opportunities. Insight to the quality and quantity of the engineering team, strategic direction with respect to rewards and governance, and how a project is communicating with users are all important factors to consider. Given the collaborative nature of the industry, reviewing message boards and white papers can give you an edge with respect to a project's probability of success as well as an understanding of who else believes in the opportunity. Typically, the more successful projects have greater transparency, well known investors, and a raucous following.





KEY RISK FACTORS

IMPERMANENT LOSS RISK

The impact of price volatility to the assets you lent to a liquidity pool. To understand this risk factor, one must understand how automated market makers ("AMM") set prices. While many systems are now evolving, Uniswap's AMM has become increasingly popular. Each pool sets the price for assets based on the ratio of two assets. For instance, an ETH-Dai pool may include 10 ETH and 15,000 Dai (meaning each unit of ETH will be priced at 15,000 Dai / 10 ETH = 1,500 Dai). Now, let us assume that the value of ETH increased from 1 ETH = 1,500 Dai to 1 ETH = 2,000 Dai. In this situation, traders would have been adding Dai to the pool and removing ETH so that the spread in the ratio increases. Alternatively, if prices were to decline, traders would add ETH and withdraw Dai. The ultimate premise is that the total dollar value of the pool remains constant over time.

Back to the scenario where prices increase, the initial investment for each unit of ETH would have been 1 ETH and 1,500 Dai (representing 10.0% of the total pool for a total value of \$3,000). To reach a price of 1 ETH = 2,000 Dai, investors would have had to add Dai and remove ETH. In this particular case, the pool would change from 15,000 Dai and 10 ETH (ratio of 1,500:1) to approximately 17,193 Dai and 8.6 ETH (ratio of 2,000:1).

An investor withdrawing their assets from the pool at maturity would be able to take out 10.0% of the liquidity pool: 1,719.3 Dai and 0.86 ETH (valued at 2,000 = 1,720 Dai) = 3,439 Dai.

If the investor chose to hold the ETH instead of contributing it to the liquidity pool, the value would be 1 ETH = 1,500 Dai * (2,000 / 1,500) = 2,666 Dai + 1,500 Dai = 4,166 Dai.

The investor's impermanent loss in this case is 3,439 Dai / 4,166 Dai = 17.4%. Typically, the magnitude of the losses is greater with a larger dollar equivalent investment and greater price volatility.

Liquidity pools hope to mitigate the risk by sharing in the fees from trading activity linked to the liquidity pool that one lent to. Emerging protocols are attempting to meet this challenge through novel concepts such as risk distribution or greater ROIs, each decision with tradeoffs between speed, security, and interoperability. For example, Bancor is now offering single-sided exposure to liquidity pools with impermanent loss protection that sets in after 90 days.

OVERVIEW

A general arbitrage (colloquially referred to as 'arb') strategy involves taking advantage of price discrepancies in different markets.

In traditional markets, forex trading has popularized arb trading where there may be price inconsistencies among 3 (or more) currencies, known as triangular arbitrage.

ARBITRAGE

OVERVIEW & STRATEGY IMPLEMENTATION

For example, assume the following prices at the following financial services organizations:

COMPANY ABC: USD / MXN: 20.14 COMPANY EFG: USD / CAD: 1.28 COMPANY XYZ: MXN / CAD: 0.063

If an investor is looking to profit on a 1,000 MXN trade, they may:

A. CONVERT 1.000 MXN TO DOLLARS AT A RATE OF 20.14.

This would translate to 1,000 MXN / 20.14 conversion ratio = \$49.65.

B. CONVERT THE DOLLARS TO CAD AT A RATE OF 1.28.

This would translate to \$49.65 * 1.28 conversion rate = 63.65 CAD.

C. FINALLY, CONVERT BACK TO MXN AT A RATE OF 0.063.

This would translate to a 63.65 CAD / 0.063 conversion ratio = 1,010.32 MXN.

(NOTE: ACTUAL FIGURES ARE NOT QUOTED, FIGURES ABOVE ARE EXAGGERATED TO DEMONSTRATE THE TRADING STRATEGY.)

The return for this strategy would be 1.0% (1,010.32 MXN / 1,000 MXN – 1) and would be implemented by taking advantage of pricE fragmentation among the three institutions.

Over the decades, improved forex trading liquidity has minimized arbitrage opportunities through increased competition, lower spreads, and the diversity of traders. Taking advantage of these discrepancies now requires advanced trading technologies, leverage, and engineering sophistication.

DeFi platforms provide investors with multiple venues with significant price fragmentation to take advantage of. DeFi arb strategies can be broken down into two categories: Yield arb and cross-exchange arb.





EXCHANGE ARBITRAGE

Given the early-stage nature of the DeFi industry, increased fragmentation has provided arb traders an inefficient market ripe for short term trading opportunities. Highly sophisticated trading bots constantly scan for opportunities to execute triangular arbitrage strategies for high probability trades. Investors today utilize two primary strategies on Ethereum: (i) atomic batch-based processing of transactions to implement strict limit order controls on the pricing between exchanges, meaning the trades do not execute unless you get the fill on your trade or (ii) priority gas auctions where investors attempt to benefit from constantly modifying gas fees to miners to execute a particular trade up until the point of profitability.

Competing in this space is exceedingly difficult given the complexity of trading infrastructure required, the creation of trading bots and improvement in latency technologies has minimized any potential for average traders to gain an edge. Further, gas-based arbitrage has contributed to congestion on the Ethereum network and increased costs significantly.

YIELD ARBITRAGE

Yield arb strategies are focused on benefitting from price discrepancies across different lend / borrow products. Today, all lend / borrow products require collateral-based loan structures as the extension of unsecured credit is essentially non-existent today. If the Supply APR (i.e., the investor lending to the pool) is greater than the Borrow APR (i.e., the investor takes out an overcollateralized loan), a trader can borrow against their assets and capture an interest rate spread.

The investor will need to ensure that the lock up periods are aligned as to not cause a liquidity mismatch between assets and liabilities. The spread between the lend/borrow rates have traditionally ranged between -5% to about +10%. Understanding the interest rate calculation is critical as variable interest rate products can impair returns.

This strategy could be performed on the same platform, across DeFi platforms, or even across centralized finance (CeFi) platforms. Furthermore, investors could take staking risk between two different tokens; for example, swap XTZ tokens for DOT tokens to try and capture an APY spread.

ARBITRAGE

KEY RISK FACTORS

IN GENERAL, YIELD ARB STRATEGIES HAVE THE FOLLOWING RISK FACTORS:

LIOUIDITY RISK

While the markets have growth quite substantially over the last few years, they still pale in comparison to traditional markets such as stocks and bonds.

Supply / demand imbalances may persist and upset any trading strategy.

LOCK UP RISK

When merging different platforms or protocols, it is important to understand lock-up periods for each type of smart contract you are interacting with.

Staked assets, for example, will mandate a holding period to earn rewards.

BASIS RISK

Swapping in between assets carries beta risk pertaining to the underlying token. For example, swapping DASH and the same amount of XTZ for a potential APY play also carries the risk of not being able to repay principal if an asset appreciates versus another.

For example, say an investor swaps \$100 in DASH earning 5% for \$100 in XTZ earning 7% to capture a 2% yield differential. If DASH appreciates versus XTZ, the investor may end up executing the trade at a loss.

Assume at maturity of the contract that the same number of units of DASH is valued at \$120 (up from \$100) and XTZ is valued at \$90 (down from \$100). The investor will have to make up for the \$30 gap between the two assets at inception.

Further, because the XTZ staking was token-based, the value of the staked rewards would not be as valuable as the DASH units received (all in terms of a dollar). The investor would only benefit if XTZ grew in value relative to DASH or if values remained equal over the borrow period.

Investors with a particular position in direction of the two assets may speculate on the differential between the two assets, also benefitting from the net interest margin received.

An important rule of thumb here is to make sure you understand what your liabilities are denominated in versus what your assets are denominated in.



DeFi platforms have manifested out of a desire to disrupt intermediaries in financial services. In doing so, the elimination / reduction in counterparty risk has led to a substantial increase in 'software risk.' Given the nascence of the market and lack of audit history, there are numerous blind spots in the future growth of the industry. Decentralized insurance has emerged as a potential solution; however, the depth of liquidity and clarity on payout logistics remains uncertain.

The Nexus Mutual, for example, has created a marketplace for coverage against smart contract failures. Individuals can either buy NXM tokens to provide liquidity to the platform or obtain insurance against their DeFi exposures. The amount of insurance that can be provided by the platform is equal to the value of total liquidity locked in smart contracts (most denominated in ETH today). From there, an algorithm determines the optimal pricing and amount of coverage that could be sold. These policies can be priced according to supply / demand imbalances, claims frequency, type of platform, etc.

Essentially, Nexus Mutual is creating a marketplace for DeFi-focused insurance products that will enable the next generation to better price risk in a decentralized manner. As of Feb. 8, 2021, coverage on the Nexus Mutual platform stands at \$738.7 million and total premiums paid equals \$13.2 million. The most interesting piece of the puzzle relates to claims assessment and repayment. Nexus Mutual has created a "crowd-sourced" model that seeks to incentivize good behavior through token incentivization. Another key risk factor relates to oracle stability related to claims / risk assessment and payout mechanisms.

FUTURE INVESTMENT STRATEGIES

OTHER PROJECTS IN THE DEFI SPACE ARE
ATTEMPTING TO DEMOCRATIZE EVERY ELEMENT
OF CENTRALIZED FINANCIAL SERVICES.

Derivatives trading for both hedging and speculation has grown considerably over the last year. While the markets remain significantly illiquid, it represents a potential growth market incentivized by fragmented markets / opportunities.

Projects attempting to mirror the performance of other markets like stocks, interest rate indices, commodity markets, and other real assets powered by non-fungible tokens are looking to expand both their scope of access and aggregate liquidity.

Even markets as deep as interest rates and forex have started to gain traction.

A final component of the industry will require insurance products to cover the risk of smart contract failure and unsecured credit to allow more optimized risk to reward scenarios on DeFi.

Already, we have witnessed the rise of an entire asset class built by entrepreneurs aimed at bettering the world through innovation.



MEET THE TEAM

Sarson Funds serves the financial professional community and their clients by providing cryptocurrency and blockchain technology educational services and investment solutions. Maintaining a fiduciary standard at all times, Sarson Funds brings Wall Street standards for research, risk management and transparency to digital asset investing.

With a belief that disruptive innovation requires a disciplined approach to risk management and education, Sarson Funds caters services towards educating Wall Street and the financial advisor community, bridging the gap between traditional finance and this new-age asset class.

Sarson Funds provides risk-managed digital asset investment strategies to financial advisors and their accredited investors clients. A leader in cryptocurrency investor education, Sarson Funds provides a robust ecosystem of educational resources, Wall Street-grade research, and a platform of transparent investment strategies





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