IntoTheBlock

The institutional DeFi Trilemma

Balancing Risk, Reward, and Capacity in Decentralized Finance

AN IN-DEPTH REPORT BY INTOTHEBLOCK RESEARCH
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Contents

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Introduction – The 3 Dimensions of DeFi

Blockchain technology has enabled the creation of a decentralized finance (DeFi) ecosystem promising to improve upon many of the traditional system's faults and creating a broad range of opportunities. Leveraging blockchain's unique capabilities, DeFi allows anyone to access financial services and participate in the nascent onchain economy.

In this paper, the IntoTheBlock (ITB) research team examines the core pillars of DeFi: we dive into the base frameworks used to evaluate protocols, discuss the different sources of yield, explore the most popular DeFi strategies, dissect the key risk factors and, finally, project how it is likely to evolve into a trillion dollar space.

It is worth noting that we explore DeFi mainly through the lens of yield-generating strategies, rather than speculative token investing. We begin by discussing the main factors considered at ITB when reviewing DeFi protocols.

Risk-Reward-Capacity

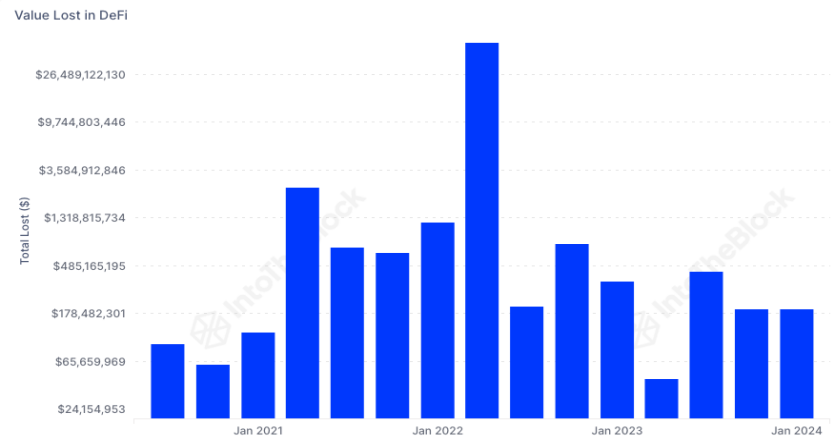
From a first principles perspective, when someone invests capital, they are seeking a return and risking to lose part or in some cases all of their investment. In DeFi, that core premise prevails, but not only are the risks and rewards different, there is also a third dimension to consider: capacity.

Capacity is the amount of capital that can be deposited into a DeFi protocol or strategy such that:

a. Yields remain above benchmark rates,
b. Risks present are mitigable, and
c. There are no violations of protocol-set constraints

Based on this definition, capacity is a derivative of risks and rewards. Let's continue with those two dimensions before delving further into capacity.

DeFi offers a variety of options to users, yet it can be highly complex and risky. Moreover, risks tend to be more nuanced than in the traditional finance (TradFi) markets. Volatility is the main variable used to measure risk in TradFi. In DeFi, for better or worse, there are many more variables to consider when evaluating risks. Risks are also arguably more relevant within DeFi, where over $58B has been lost through a series of exploits and collapses.

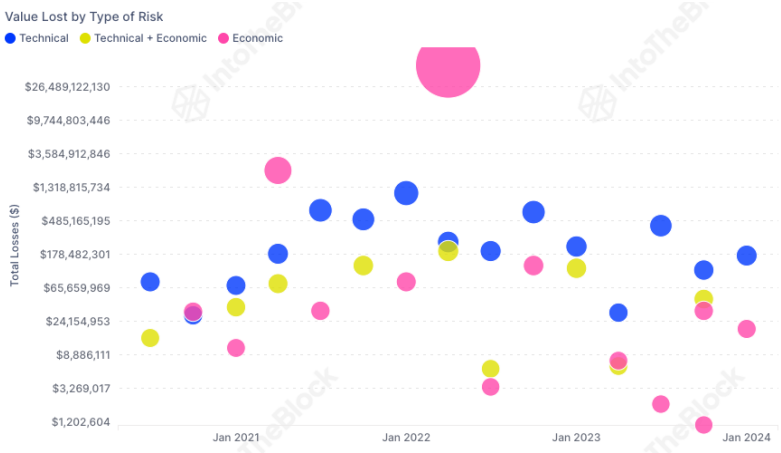


Source: IntoTheBlock DeFi Exploits Perspectives

IntoTheBlock estimates there have been over 140 incidents where DeFi protocolsÕ users have lost funds they deposited. The underlying reasons for these losses can be broken down into two main factors:

1. **Technical Risks** - These arise from vulnerabilities in smart contracts, front-end code and improper key management. Some examples include re-entrancy attacks and phishing founders to get access to multi-sigs with user funds.
2. **Economic Risks** - Factors stemming from supply and demand imbalances either from natural market forces or improper protocol design. Common economic risks include liquidations, impermanent loss and depegging events.

There are also incidents such as oracle manipulation attacks, where a mix of technical and economic risk factors are exploited.



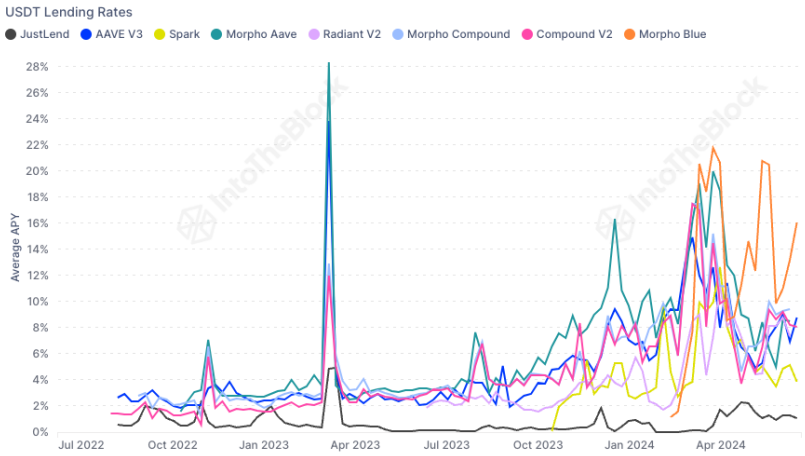
Source: IntoTheBlock DeFi Exploits Perspectives

In most quarters technical risks led to larger losses than economic ones. However, there are two large outliers where losses due to economic factors eclipsed all other incidents. Namely, these are due to the Terra and Iron Finance collapses, two algorithmic stablecoins with flawed mechanisms leading to near-infinite supply of tokens being minted trying to repeg their stablecoins. Outside of these large calamities, other incidents of losses due to

economic factors involve price manipulation attacks and impermanent loss (the latter which is not accounted for in the charts above).

DeFi Rewards

Contrary to risks, rewards tend to be much simpler to quantify. The simplicity to measure the rewards in a DeFi strategy are directly related to the complexity of the protocol(s) being used. One of the most rudimentary DeFi strategies is supplying liquidity into a lending protocol like Aave, earning yield from borrowers loaning out your deposits.



Source: IntoTheBlock Lending Protocols Perspectives

Lending rates act as a barometer for the appetite for leverage within DeFi. The reward that lenders earn from supplying liquidity is highly influenced by market conditions. In the image above, it can be seen that lending rates grew in unison across protocols shortly after the Bitcoin ETF was launched early in the year, sparking a market-wide rally. This led to annualized returns as high as 15% to 20% for a few weeks.

This is one of the clearest examples of the rewards that can be earned through DeFi protocols. In the Where do Yields Come From? section we explore returns for more complex strategies.

Capacity

So far we have covered risk and reward, both which have parallels in the TradFi world. In contrast, the third dimension for DeFi strategies, capacity, is usually not a factor at all.

Take treasuries as an example: how much can someone deposit into 2-year TBills? The answer is near infinite. The impact on rates from buying the US government bonds is negligible for any institution outside perhaps the largest sovereigns.

Yield-generating strategies in DeFi are much more constrained, making capacity a crucial variable.

Capacity is a function of yield decay and risk management. From a yield perspective, say there is a stablecoin pool

with $500k in liquidity, paying 10% APY through incentives. If you deposit another $500k into the pool, the yield is projected to decay to 5% all other things being equal. Is it worth earning 5% on stablecoins when treasuries pay the same and are deemed risk-free? For most, the answer will be no, thus making the capacity to deposit into this strategy less than half a million dollars.

Therefore, capacity from a return perspective effectively measures how much can be deposited such that rates still remain at a minimum slightly higher than benchmark yields. For stablecoins, the benchmark is treasuries; for ETH and other proof of stake assets, the benchmark would be their staking rate.

Then from a risk perspective, it is worth evaluating how protocols manage liquidity to understand what level of exposure is acceptable. In automated market makers (AMMs) like Curve, liquidity providers (LPs) can be penalized for imbalancing pools. By withdrawing just one asset from a pool containing two or more assets, LPs incur an exit fee in the form of slippage. Depending on the percentage of the liquidity being withdrawn, the exit fee gets exponentially larger. This limits the capacity in a pool to often be just 10% of the liquidity. We provide an example explaining why that is the case in the Navigating Yield Strategies section.

Risks like these limiting capacity vary from protocol to protocol. Quantifying these at times can be complex, making it difficult to understand how much exposure liquidity providers should have into a protocol. Throughout the rest of the paper we discuss some of the factors to consider when determining capacity for different DeFi strategies.

Before that, let's first dive into the fundamentals of yield generation in DeFi.

Where do Yields Come From?

The DeFi ecosystem has successfully drawn significant capital over time, partly due to those who are genuinely committed to the principles of financial freedom, and partly because of opportunists seeking to maximize their investment returns with a technology that often promises attractive yields.

These opportunists encounter a complex and evolving environment that many find difficult to fully comprehend. The ecosystem presents a variety of yields, each accompanied by different levels of risk. Understanding these parallel aspects is crucial for investors aiming to succeed in this market. This section introduces the most common yield options in DeFi and explores how they are generated.

Staking

Proof of Stake involves depositing a network's token in a contract to serve as a validator of transactions and security for the chain. In return, the user who locks their tokens is rewarded with transaction fees and, if applicable, additional network token emissions. This type of yield is available exclusively on blockchains that utilize a proof of stake consensus mechanism.

Rewards are distributed in the native blockchain token and are considered the standard annual percentage yield (APY) for that token. In traditional financial markets, this could be likened to the rate offered by US Treasury bonds.

Source: IntoTheBlock ETH Staking Indicators

The amount of rewards typically fluctuates based on the level of activity the blockchain has and the number of tokens staked. The higher the network demand for validating transactions, the more fees the network generates, and consequently, the higher the APY for stakers becomes. For instance, as of June 2024, the highest ever daily fees generated by Ethereum, in dollar value, reached $484 million on May 10th, coinciding with the launch of Board Apes' Otherside metaverse land sale.

Liquidity Providing Fees (Trading Fees):

To provide liquidity, Liquidity Providers (LPs) contribute an equal value of two cryptocurrency assets to a liquidity pool, which is a collection of cryptocurrencies held in a smart contract. In exchange for locking up their funds, LPs receive an LP token, which is proportional to their contribution to the pool. These tokens can be redeemed for the LP's corresponding share of the pool. This liquidity provides a platform for traders seeking to acquire one of the two assets. It facilitates liquidity, and in exchange, a fee is charged for each transaction. This process enables LPs to earn returns on decentralized exchanges (DEXs) through transaction fees.

Different DEXs have implemented various systems and trading fee tiers. The returns for LPs primarily vary based on the trading volume processed through the pool in which they have deposited, and the fee tier (Pool tier) that is charged to traders. From a trader's perspective, lower trading fees are preferable. However, without sufficient liquidity, traders might face significant slippage or price impact during their transactions. From the perspective of Liquidity Providers, charging higher trading fees can increase their earnings. However, if the fees are too high, traders may be disincentivized from using that pool, as the costs could outweigh the benefits of trading there.

Lending Rates

This type of yield generation is specific to lending protocols, where users deposit an asset to allow others to borrow it in exchange for paying an interest rate. Generally speaking, each asset has its own market of supply and demand, each characterized by an APY that fluctuates with demand to borrow the specific asset. The interest rate payment on loans is distributed among suppliers, who share the interest paid by borrowers. This amount corresponds to the average borrow rate multiplied by the utilization rate. The higher the utilization of a reserve, the greater the yield for suppliers.

The earnings of a supplier in a lending market are determined by the current borrowing demand. The higher the borrowing demand, the greater the utilization rate, and consequently, the more a supplying user earns from their supplied assets. Similarly, the lower the borrowing, the lower the utilization rate, resulting in reduced returns for the assets supplied. Borrowing demand is typically influenced by market cycles. When the market outlook is positive, more users seek to leverage their positions, leading them to borrow against their assets in lending markets. When the market outlook appears less favorable, borrowing demand decreases as users are less inclined to increase their market exposure and prefer to deleverage in anticipation of a bear market.

Liquidity Mining (Incentivized by Governance Token):

Liquidity mining is an incentive strategy initially introduced by the Synthetix protocol, where protocols distribute their governance tokens to liquidity suppliers. This approach not only boosts the yields of participants but also aims to attract greater liquidity into the protocol. This strategy helps in decentralizing the governance of the protocol by distributing it among those actively involved, while simultaneously enhancing their yield to encourage greater liquidity. In traditional business terms, this strategy employed by protocols can be likened to a company's user acquisition cost, where incentives are used to attract and retain users.

The yield boost received by users in the form of governance tokens can fluctuate due to various factors, ultimately affecting the final outcome of the users' APY. Fluctuations in the price of the governance token can impact the

APY. If the value of a governance token declines while a user is harvesting their rewards, by the time the user sells, they would receive a lower APY on their initially allocated capital.

The frequency of reward distributions to depositors can also affect the final APY of the deposited capital. The shorter the interval between reward distributions, the sooner investors can sell their rewards and reinvest them, thereby compounding their returns more effectively. When evaluating this strategy, consider whether the protocol mandates locking liquidity for a specified period to earn rewards. This requirement can diminish the strategy's appeal, as locking capital restricts users' ability to withdraw their funds freely.

Airdrops

Protocols that do not initially have a token but intend to decentralize their governance often introduce a governance token into the market as part of their roadmap. Protocols typically introduce their tokens by "airdropping", which distributes a percentage of the token supply to selected users. These users typically include early liquidity providers and those who have contributed positively to the ecosystem's growth, with specific criteria determined by each protocol on a case-by-case basis.

Key Metrics: Airdropped Tokens

Protocol	Symbol	TVL	Monthly Price Change	Market Cap	Initial Value of Airdrop	Supply % Airdropped	Project Launch Date	Capital Raised
Uniswap	UNI	$5,868,626,305.35	51.73%	$8,672,103,393.56	$450,000,000	15.00%	Nov-2018	$176M
Arbitrum	ARB	$3,031,160,977.29	-9.27%	$2,670,769,300.08	$1,700,000,000	12.75%	Aug-2021	$123.7M
Optimism	OP	$742,788,689.8	-17.79%	$2,279,731,677.78	$300,000,000	5.00%	Jul-2021	178.5M
Starknet	STRK	-	-19.06%	$1,215,153,921.65	$2,470,000,000	7.30%	Jun-2020	$282.5M
Ethena	ENA	$3,523,287,928.54	1.54%	$1,206,343,849.14	$470,624,250	5.00%	Dec-2023	$20M

Rows 1-5 of 14

Source: IntoTheBlock Airdrops Perspectives

When a protocol airdrops its tokens to users, it can be likened to a company being listed on a stock market, making its shares available for public trading by investors. Once a protocol airdrops its tokens, the market determines a value to the protocol. In relation to traditional finance, these governance tokens begin trading similarly to company shares.

The market valuation determines the success or failure of a token airdrop, with the valuation largely depending on the protocol's adoption. Protocol adoption is often measured using various key metrics, such as fees generated by the protocol, the number of active users, the number of transactions, and transaction volume, among others.

Points

Point systems have become a popular mechanism in DeFi, often indicating that a protocol is gearing up for an airdrop.

This new approach, which standardizes and organizes airdrop distributions, emerged in 2023 with the introduction of the Blast protocol. In these systems, protocols clearly define actions users can take to earn points, which are later converted into the protocol's tokens upon launch.

Points system gained traction when protocols like Pendle started creating prediction markets, allowing users to estimate the potential value of their points once the protocol airdropped its tokens. This enabled investors to anticipate the future value of their points, providing them with greater insight into their potential liquidity returns.

Despite their popularity, point systems have faced criticism. For instance, Eigenlayer's launch of the EIGEN token was met with disappointment when the protocol announced that the token would initially be non-transferable. This decision prevented users from trading the token and capturing the value of their accumulated points.

Innovation in Yield Generation

The DeFi ecosystem continues to innovate with new methods for yield generation and governance token distribution. Strategies such as LP trading fees and lending rates exemplify creative adaptations of traditional financial methods within the DeFi landscape. Additionally, liquidity mining, airdrops, and points systems showcase evolving and innovative approaches for decentralized protocols to engage with their contributors. The innovation in yield generation possibilities highlights the dynamic nature of the DeFi space and underscores the need for constant evaluation of new potential mechanisms.

Navigating Yield Strategies for Optimal Returns

Comparing Yield Strategies

DeFi's permissionless design makes it possible for nearly any type of financial vehicle to be created on-chain. This allows for a nearly infinite number of composable strategies when it comes to generating yields on assets. While permissionless composability allows investors to layer different financial products to create complex yield-generating strategies to maximize returns, it also means that investors are layering risks on top of each other. Increased complexity often signals a near-exponential growth in risk as risk vectors multiply.

This means that often the optimal risk-return ratio in crypto can be derived from straightforward strategies that are composed of only a handful of different primitives. Managing economic and technical risk in DeFi is already complex. Therefore simple strategies can help reduce risk exposure while still earning high yields.

While composability can allow for a diverse selection of strategies, we will highlight a selection of strategies that generate high returns while minimizing risks by reducing complexity in this section.

AMM Liquidity Provisioning: This strategy entails depositing token(s) into a shared pool that is used to facilitate trades between the tokens in the pool. The AMM pools generate fees for liquidity providers every time a user swaps between the two assets and also often have liquidity bootstrapping incentives.

Within liquidity pools, there are two sub-categories, volatile and stable pools. Volatile pools consist of pools with two low-correlation assets. While they can produce high swap fees, they carry higher economic risks such as impermanent loss (IL) which can put a position in a net loss over time. Stable pools, which consist of two highly correlated assets, often have lower yields than volatile pools but are consistent with their earnings with negligible impermanent loss.

> Impermanent loss occurs when the value of assets in a liquidity pool changes compared to holding them individually, leading to a potential reduction in total value.

Recursive Lending: Lending protocols that incentivize their money markets, create an opportunity for investors to supply and borrow the same asset, essentially leveraging their initial deposit. The incentives provided by the protocol offset the costs of borrowing assets from the market, making the strategy profitable. This strategy has liquidation risks but they are low due to identical collateral and borrowed assets.

Leverage Staking: Enabled by liquid staking tokens (LSTs), this strategy uses an LST as collateral to borrow the underlying asset (ETH). The borrowed asset is then swapped for more of the LST to repeat the same cycle until a desired leverage has been reached. This strategy is profitable when the staking yields are higher than the cost of borrowing the underlying asset. Similar to the recursive lending strategy, there are liquidation risks associated

with this strategy. The risk is slightly higher than in recursive lending due to the possibility of the LST depegging from its underlying asset price. However, liquidation risks remain relatively low.

Supervised Lending: A strategy that combines aspects of both AMM liquidity provisioning and lending, Supervised lending is designed to earn yields on less productive assets such as BTC. This is executed by providing the unproductive asset (BTC) as collateral to borrow a more productive asset (ETH or stablecoins). The borrowed asset is then deployed into a secondary strategy that earns high enough yields to meet the set benchmark yield for the initial BTC. The secondary strategy can be any other strategy but often involves deploying into an AMM stable pool.

As a more complex strategy, it also has more risks. Liquidation risks are higher than the recursive lending and leveraged staking due to using lower correlated assets in the lending/borrowing leg of the strategy. Additionally, the strategy takes on risks associated with depositing into AMMs, such as IL.

Strategy Summary

These yield strategies highlighted above are some of the most well-known examples of strategies that a user can execute in DeFi. While they all have certain economic risks, these risks can be managed and mitigated with the proper risk engines and contract automation. Being able to confidently control economic risks means that the key choice for users is only based on their larger portfolio strategy and the types of assets they want to deploy.

Strategy	Strategy Profile	Returns	Considerations	Key Risks
AMM LP	High yields and capacity	Medium-High	High and low volatility options, two asset exposure	Impermanent loss (IL)
Recursive Lending	Relatively Safe Yields	Medium-High	Only works when incentives provided, one asset exposure	Liquidation
Leveraged Staking	Sustainable Real Yields	Medium	Unprofitable if borrow rate > staking yields, two similar assets exposure	Liquidation
Supervised Lending	Yields on unproductive assets	Low-Medium	Complex, uncorrelated asset exposure	Liquidation, Impermanent loss (IL)

ITB Paper Table 1A: Strategy Breakdown

The table above provides a snapshot overview of each strategy and what key items and risks need to be considered when choosing the strategies to add to your portfolio.

Strategy Profiles

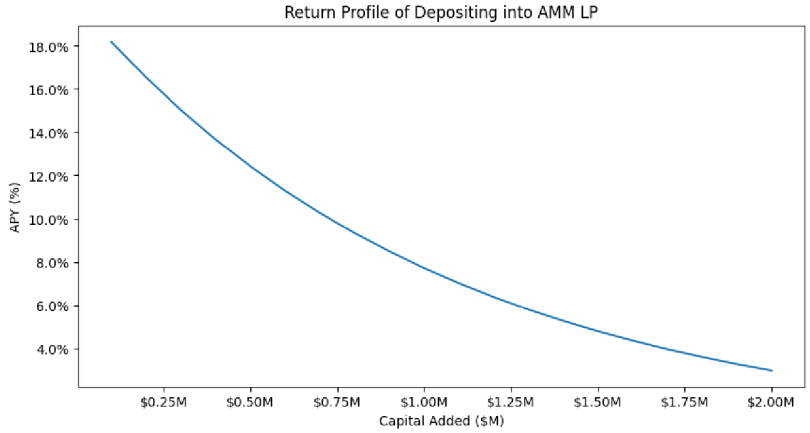
Choosing the DeFi strategy that best fits a portfolio depends on two main factors, risk and returns. However, these two factors can be subcategorized into smaller factors. Within the risks category, capital loss due to IL as mentioned in the previous section are key, but other risks such as strategy deployment costs, capital accessibility and concentration need to be considered. Apart from yields, strategy costs and capacity must be evaluated to get a holistic understanding of a DeFi position. Considering all these factors can help an investor determine the optimal strategy and returns.

Below we will explore the strategies highlighted in the previous section and examine in further detail the risks to monitor and the return profiles to expect from the strategies.

AMM Liquidity Provisioning

Returns

Depositing into an AMM liquidity pool provides returns that are directly correlated to the amount of capital that has been deployed. In most AMM pools that are incentivized, the incentives are distributed equally across all capital deposited into the pool. This means that APR on yields decays linearly as the pool size increases.



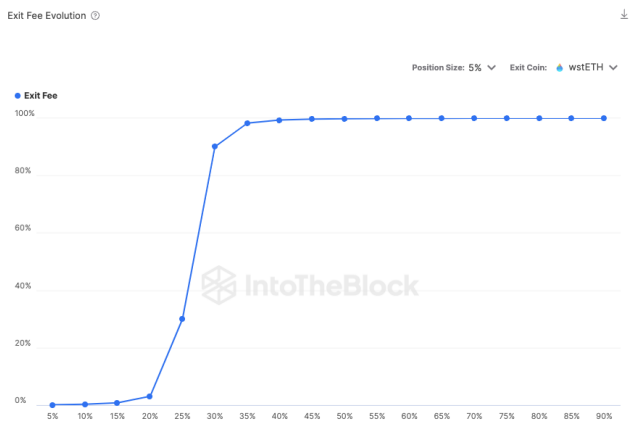
ITB Paper Chart 1B: Return profile of an incentivized AMM pool

As new capital is added to the pool, the expected APY gets diluted. Since expected returns decrease as more capital enters the pool, the initial size of the pool relative to the capital deployment needs to be considered.

Depositors also receive fees from users who engage in trades via the pool. These on top of the incentivized APY that a depositor would receive. The return profile in Chart 1B shows the incentivized APYs which usually make up the majority of the returns.

Risks

Certain risks that should be considered when finding the optimal returns for an AMM strategy are the costs associated with deployments. Specifically for an AMM pool, entering and exiting the pool single-sided (with only one asset) can play an important role.



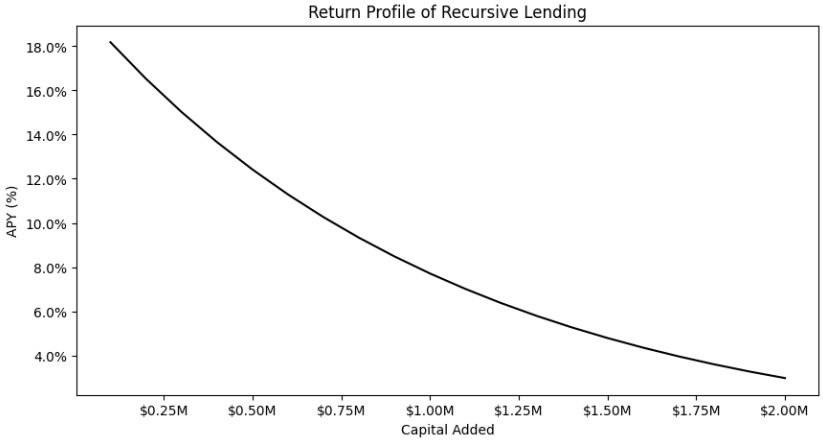
Source: IntoTheBlock Curve Risk Radar

The risk of high costs for entering or exiting a pool is clearly shown in the Exit Fee Evolution indicator above for the wstETH/pufETH pool. Since the pool is currently highly imbalanced towards pufETH, if a user wanted to withdraw their capital as only wstETH, they could quickly begin to incur slippage fees (as the portion of the liquidity is swapped from pufETH to wstETH) of almost 5%. These types of fees can put a users capital at risk and should be considered when determining the size of a deployment.

Recursive Lending

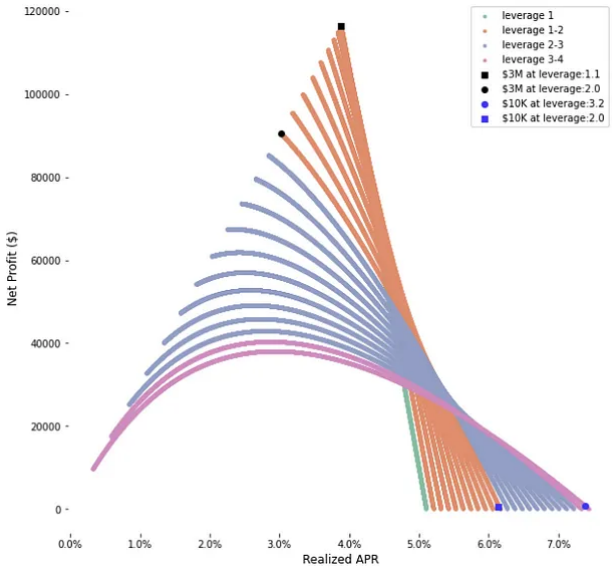
Returns

The return profile on recursive lending is similar to that of AMM pools since the primary yields come from incentives provided by the lending protocol or by external sources. As more capital is added into the strategy the incentives will be diluted linearly.



ITB Paper Chart 1B: Return profile of an incentivized AMM pool

As leverage is used in this strategy, this needs to be considered as a factor. Leverage will play a role in the users returns and can be optimal at different levels depending on the size of the deployment.



IntoTheBlock PaperChart 1E:Simulation of optimal leverage in recursive lending

Since this strategy lends and borrows at the same time, the cost of borrowing could start to outweigh the returns of lending. In this situation, to maximize returns, it is better to have lower amounts of leverage. In Chart 1E, we can see that for this example market, a user will have higher returns at lower leverage when deploying $3M of assets, where higher leverage is more suitable for smaller deposits. This translates into a strategy's capacity being tied to the desired amount of leverage.

Risks

Liquidations are the primary risk for any lending strategy, but other risks do exist. One example is the available liquidity in the lending market. Available liquidity refers to the amount of assets in a market that have not yet been borrowed. Deploying a position with an available liquidity buffer can help prevent assets being "locked" in the circumstance where the total assets lent out by a user is larger than the available liquidity, resulting in not being able to withdraw some assets.

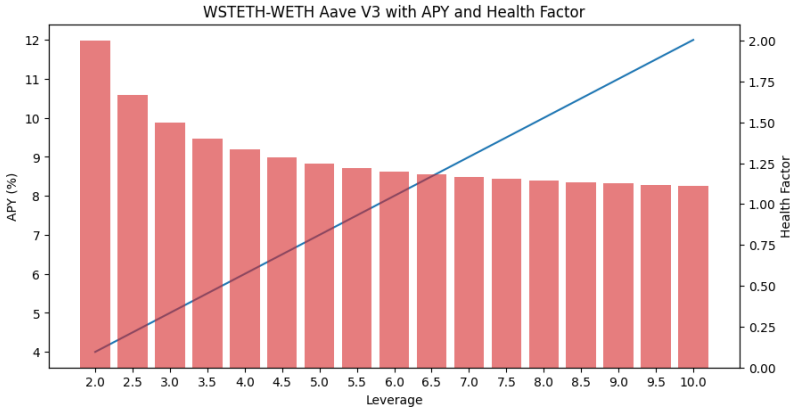
Source: [Available liquidity Indicator from IntoTheBlock Risk Radar]

The chart above provides an example of the Available Liquidity risk indicator. As we can see, the available liquidity in this DAI market has been decreasing over time, indicating that any deployment into the market should be at a smaller scale compared to a year ago to keep a liquidity buffer.

Leveraged Staking

Returns

Leveraged staking returns are directly proportional to the leverage used. As long as the borrow rates for the underlying asset (e.g. ETH) are below the staking rate, the position will earn higher APY as leverage increases.

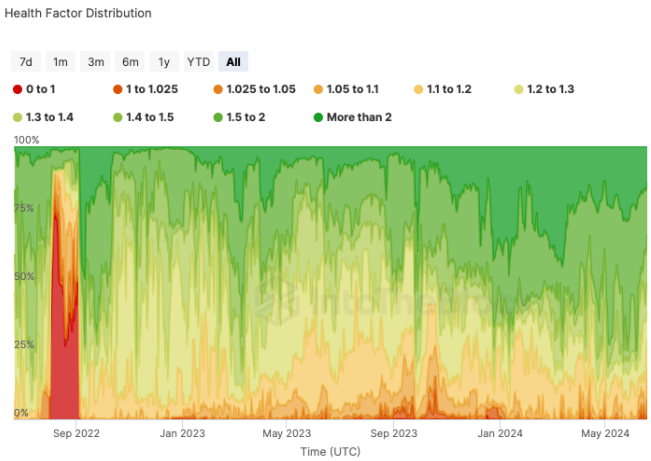


IntoTheBlock Paper Chart 1F: Return profile with health factor risks for leveraged staking

Simple staking yields have been ranging between 2% and 4% for the last year. With leverage staking, a position can potentially produce yields above 10%. However, this comes with increased liquidation risks.

Risks

In leverage staking, monitoring the health factor of all positions in the market can help a user avoid most risks like liquidations. This takes prominence during instances when the borrowing rate for the underlying asset becomes higher than staking yield.



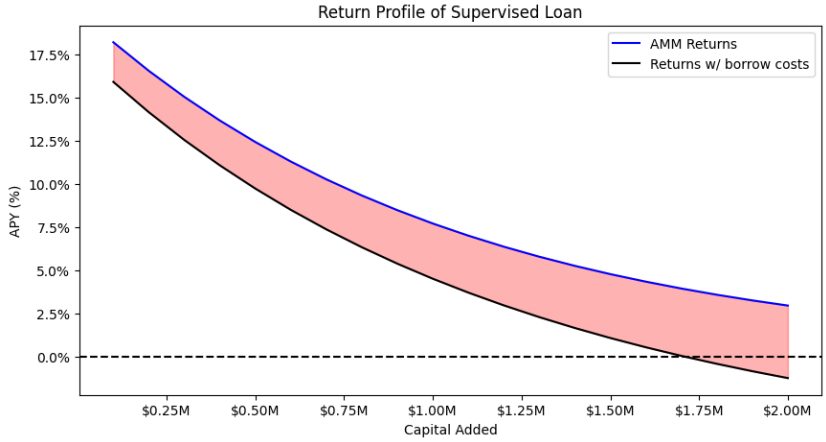
Source: Health Factor Distribution Indicator from IntoTheBlock Risk Radar

In these moments where the strategy temporarily has negative returns, other users with high leverage that have lower health factors will be liquidated or exit their position. If these positions are fully exited the utilization ratio in the market will increase, making users with higher health factors at risk of liquidation. Tracking the health factor in these moments can give users warning to deleverage in advance.

Supervised Lending

Returns

A supervised loan combines two strategies: a lending strategy and a yield strategy. The lending strategy often has a net negative yield since borrow rates are higher than supply rates. Therefore the yield strategy has to have a high enough yield to still produce positive returns for the strategy.



IntoTheBlock Paper Chart 1G: Example return profile of supervised loan using an AMM strategy

The return profile of this strategy will look similar to the yield strategy chosen. Chart 1G visualizes the return profile of a supervised loan using an AMM pool as its yield strategy. As more capital is deployed, the yields decrease in the AMM pool. Importantly, as more of the productive asset is borrowed in the lending strategy, the cost of borrowing increases. This causes a gradual divergence between the AMM returns and the strategy returns when borrow costs are included.

Risks

As supervised loans are composed of two underlying strategies, the risks are a composition of the risks from these strategies. In the example provided in the section above, the risks that would be relevant for the strategy would be AMM liquidity provision and lending risks. IL and exit fee costs on the AMM strategy could possibly make the strategy unable to repay its borrowed assets in full. Liquidation risks in a lending strategy could cause a user to lose their primary assets.

Capacity

Calculating the capacity to deposit into supervised loans is more complex than for other strategies. Here there are several constraints to consider. From the loan side, key factors to consider are caps in the lending protocol. If the

protocol has a maximum level that can be deposited into or borrowed from the protocol, it inherently limits capacity. Similarly, borrow APYs need to be considered, as borrowing large amounts raise the cost of the debt, restricting the size that can be accessed.

Then there are other capacity constraints based on the secondary strategy deployed. Here factors like the pool's liquidity, distribution of assets and overall yield available determine how much can be deposited.

The Role of Macroeconomic Trends in DeFi

Integrations between traditional finance and DeFi have been accelerating rapidly in the last year. Tokenized Real World Assets (RWA) can provide exposure to off-chain products such as treasury bonds and real estate. The blending of these two financial ecosystems can change the dynamics of an on-chain portfolio, with several factors influencing the risks and returns of strategies.

Benchmark Yields

As RWA have proliferated DeFi, expectations on returns have also evolved. The accessibility of tokenized T-bills, for example, has raised the expected benchmark yields of stablecoins, as many are now backed by these government bonds.

While this does present the potential of more sustainable long-term yields for certain assets in DeFi, it should also be noted that these RWAs should not yet be considered equivalents of the off-chain counterparts. RWAs on-chain contain additional risks such as smart contract risks and trust risks that don't exist in traditional finance. Certain safety nets for investors that exist in traditional markets might not exist in the crypto ecosystem and therefore insurance and the ability to recover lost assets are more complicated.

ETFs and Supply

Recent US government ETF approvals for Bitcoin and Ethereum have changed the demand dynamics of an asset class that was once isolated from these traditional markets. Large institutions now entering the market can have a significant impact on the supply of these assets. This in turn can impact the availability of these assets in DeFi, which can result in potentially higher rates for borrowing. This needs to be considered when determining strategy expectations across different time frames.

Vaults: Finding the Optimal Portfolio

The strategies presented above represent some of the most common deployment strategies in DeFi. However, this does not mean that they are simple to manage in a financial market that is active 24/7. Furthermore, the combination of these strategies together can create a complex chain of risk considerations when it comes to rebalancing and taking profits.

In DeFi, an evolution of traditional finance's structured products has produced what have been coined as vaults. These vaults can vary in technical structure, but at their core contain multiple DeFi strategies in one product.

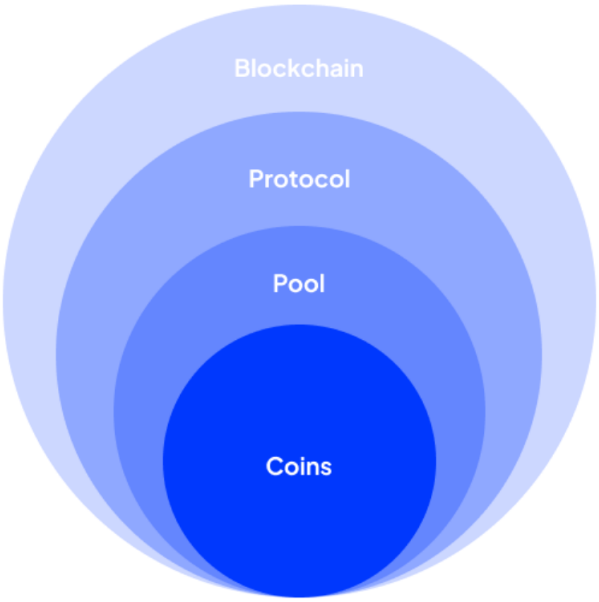
Vaults often have a global risk profile and market bias that drives the strategy choices and rebalancing which are managed automatically or by a third-party. Investors can deposit capital into the vault to earn yields, delegating the strategies technical complexities and risk management to the protocol which can efficiently optimize the vault to provide the best returns.

Some of the best advancements in crypto from an investors' standpoint are the transparency and non-custodial properties that vault smart contracts permit. For transparency, investors that deploy into on-chain vaults can get streaming updates on their positions and how they are deployed. Non-custodial vaults can exist due to the design of smart contracts, effectively making the investor the only one who can remove their funds from the vault. These improvements on similar traditional finance products provide a trustless environment for investors who want to be in full control of their capital.

Managing Risks in a Volatile Market

Overview of Key Risks to Consider

In the decentralized finance (DeFi) ecosystem, navigating a volatile market requires a critical awareness of several key risks. Market risks, liquidity risks, and smart contract risks are paramount. Market risk involves the potential loss due to adverse price movements in the assets held. Liquidity risk concerns the ability to quickly buy or sell assets without causing a significant impact on their price, realizing a loss. Smart contract risk is related to the potential vulnerabilities in the code that could be exploited, leading to financial loss due to the funds being stolen by DeFi protocol hackers.



IntoTheBlock Paper Chart 2A

Risks involved in DeFi vary depending on the layer you focus in. Blockchains themselves carry risks such as outages and re-organizations. Though these do not occur often in large blockchains, they can be a factor to consider with newer chains.

Pool-level risks tend to go hand in hand with the type of protocol being evaluated. For the rest of this section we focus on these risks, as well as some coin-level risks, dissecting their dynamics and mechanisms that can be used to mitigate them.

DeFi Portfolio Risk Management

Mitigating risks in crypto demands a multifaceted approach. Here, we explore strategies to manage market, liquidity, and smart contract risks effectively.

Market Risk Mitigation

Diversification: diversification plays a key aspect both in crypto and DeFi. The usual multi-asset diversification principle of traditional finance still applies. Even though the crypto market tends to be heavily correlated across coins, the risk-adjusted returns of different coins can vary wildly. Market overreactions to news can cause large price swings in a single hour that far exceed the usual equities short-term price variations. Portfolio diversification can provide better performance if an investor seeks more to be exposed to crypto overall.

Equally for deploying capital into DeFi protocols, from an economic standpoint, the best way to mitigate tail risks such as security vulnerabilities in DeFi protocols is through cross-protocol diversification when deploying funds. In such a diversification, a qualitative approach that weighs each DeFi protocol appropriately is recommended. Some parameters that can aid in this analysis are, for example, how many funds are deposited into each of these protocols (also known as Total Value Locked, TVL). Other key parameters include the total time that a protocol has been live with large amounts of funds deposited into them, without being exposed to any vulnerability or large funds withdrawals.

> The Lindy Effect applies well to DeFi protocols: those that have operated successfully with large amounts of deployed capital for an extended period are more likely to remain functional in the future..

Price correlation metrics are valuable for identifying coins that deviate in price performance from others. This can be measured using the 30-day correlation coefficient between the coin being monitored and a basket of other coins. Positive values (0 to 1) indicate strong correlation, allowing exposure to similar market movements between two coins. Conversely, negative values (0 to -1) indicate inverse correlation, making such coins potentially good hedges against others with which they are inversely correlated.

Source: IntoTheBlock TON Financial Analytics

Stop-Loss Orders: Implementing automated stop-loss orders can help limit potential losses by selling assets when they fall to a predetermined price. Today, most crypto trading platforms, both centralized and decentralized, offer stop-loss functionality. For instance, Uniswap and 1inch provide this feature.

However, lending protocols like Aave and Compound, which focus on loan operations, do not natively support stop-loss orders. Given that many investors use these protocols for long/short strategies, integrating this feature could be beneficial.

Fortunately, third-party protocols like DeFi Saver offer similar functionalities, building on top of these lending platforms.

Stablecoins: Allocating a dynamic portion of the portfolio to stablecoins, which are less volatile, can act as a buffer against market downturns. Right now it is not hard to find yields in the range of 8-10% for major stablecoins in several DeFi protocols. As we said, fast market downturns are very common in crypto, and having 'fuel' to increase the position on a coin at a certain moment can be extremely valuable. Regarding the allocation weight of the portfolio based in stablescoins, a dynamic approach is very common these days. Investors hold a lower share of their portfolio in stablecoins during bull markets, since they are highly allocated to the coins they hold. And start decreasing their share while the market switches back to bearish conditions, in order to have purchase power to "buy the dip".

User activity with stablecoins can be monitored through the metric of active addresses. As shown in the chart below, periods of extreme bull and bear markets are correlated with increased interactions with stablecoins, indicating heightened buying and selling activity against their stablecoin counterparts.

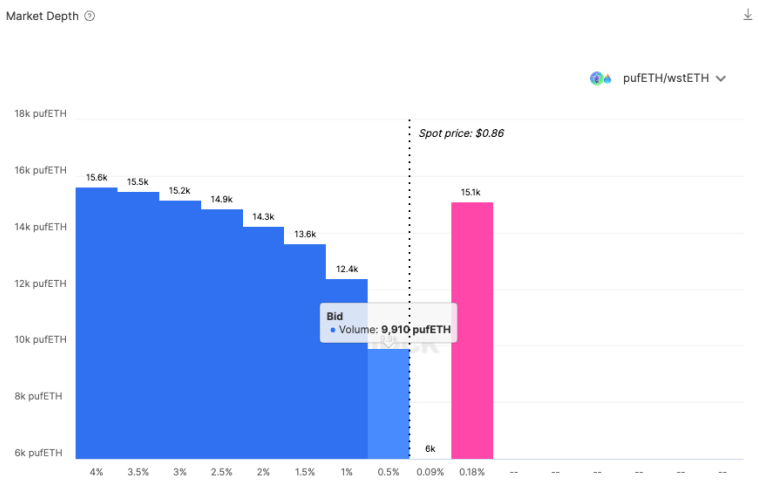
Source: IntoTheBlock USDT Perspectives

The opportunity to earn yields in DeFi (8-10%) that significantly exceed those currently offered in traditional finance (5%) presents a compelling reason to hold a substantial portion of a portfolio in stablecoins. This strategy allows investors to avoid the diluting effects of the macro inflation experienced by most major currencies globally.

Liquidity Risk Mitigation

Liquidity risks in AMMs arise when the only route to swap out a coin is through a single pool (or several of them). AMM pools can realize a large cost (known as price impact) if the pool gets imbalanced, where the desired coin to be swapped out starts to have a relatively high share of the pool composition. Mitigating liquidity risk in this situation begins with a thorough analysis of liquidity pool depth. Regularly analyzing the depth of liquidity pools ensures that there is sufficient liquidity to support large transactions without causing significant price impact. This involves assessing the pool's capacity to handle large trades smoothly, which is crucial for avoiding slippage and maintaining market stability. A deep liquidity pool can better absorb substantial transactions, providing a more predictable and secure trading environment.

Validating pool liquidity is easier when monitoring the amount of liquidity available for each price impact value. The next indicator measures the volume the market can handle on both the buy and sell side at price impact value. Here is an example of the market depth indicator of the pufETH pool on Curve, showing how there is a large amount of pufETH (up to 14.1K pufETH) that can be bought with wstETH without incurring more than 0.5% of price impact:



Source: [IntoTheBlock Curve Risk Radar]

Keeping an eye on the largest positions of the pool can be handy in understanding the adverse pricing dynamic that would develop if any of the existing large holders decide to unwind their liquidity position before the users can swap out or remove their liquidity. This might greatly affect the trading pool of the curve, resulting in much less favorable swap prices compared to those available before the large trade occurred.

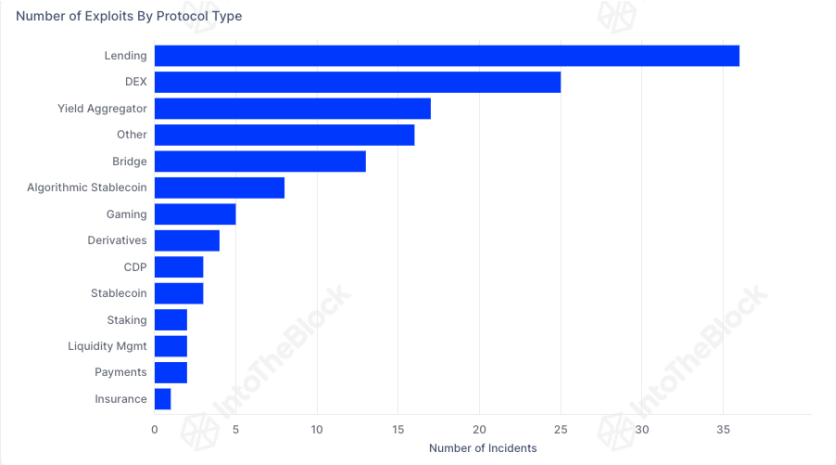
Another effective strategy is to divide a large withdrawal into several smaller ones spaced over time. This approach helps to avoid causing a significant drop in liquidity, which can destabilize the pool and negatively impact prices. By spreading out withdrawals over time, investors can maintain more stable liquidity levels, reducing the risk of triggering a liquidity crunch. This method ensures that the liquidity remains balanced and that the market can absorb the withdrawals without adverse effects.

Finally, engaging in high-volume liquidity pools with substantial total value locked (TVL) is a critical tactic. These pools are generally less prone to liquidity crunches due to their larger size and higher trading volumes. High-volume pools offer greater liquidity, which can handle significant transactions with minimal price impact. By participating in these pools, investors can benefit from enhanced stability and reduced risk, ensuring a more reliable and efficient trading experience in the volatile DeFi market.

Smart Contract Risk Mitigation

Evaluating smart contract risks from an investor point of view is not futile; there are several critical strategies that can aid to avoid depositing funds in a protocol that might get hacked in the future. The first basic step is ensuring that the smart contracts of DeFi protocols are audited by reputable third-party firms is essential. These audits help identify and mitigate potential vulnerabilities in the code, reducing the risk of exploits that could lead to financial loss. Moreover, In the last few years security is no longer a luxury the popularity of "competitive auditing platforms" has risen. These are services where multiple security experts and developers independently review and analyze smart contracts for vulnerabilities and bugs. These platforms incentivize thorough audits by offering rewards or recognition for finding critical issues.

Qualitative research can aid in evaluating the performance of different smart-contract auditory companies. A common metric is to look at the number of exploits that have happened on DeFi protocols per each security firm. Although this metric is influenced by how many protocols each company has audited (some of these companies perform several per week while others review values closer to one per month), this metric still provides valuable data for assessing audit company review quality:



Source: [IntoTheBlock DeFi Exploits Perspectives]

Additionally, DeFi protocols that support and participate in bug bounty programs demonstrate a proactive approach to security. These programs incentivize developers to find and report bugs, thereby enhancing the security of the smart contracts. By encouraging the discovery of vulnerabilities before they can be exploited, bug bounty programs play a significant role in maintaining the integrity of DeFi protocols.

Another optional strategy is utilizing DeFi insurance products that provide coverage against smart contract

failures and exploits. These insurance protocols offer a safety net, protecting investors from losses due to unforeseen smart contract issues. By transferring the risk to an insurance provider, investors can mitigate the financial impact of potential smart contract breaches.

Hedging Risks in DeFi

Hedging is a critical strategy in managing risks in the DeFi ecosystem. It involves using financial instruments or other strategies to offset potential losses. Here are the hedging techniques that are more popular among investors:

Derivatives: DeFi derivatives such as perpetual futures and options can be used to hedge against price fluctuations. For instance, purchasing put options can protect against a decline in the value of an asset. These products allow easy access to large amounts of leverage, which improves the efficiency of the trade due to requiring less collateral. Nonetheless, it is important to consider that this creates liquidation risks that require high frequency monitoring of price performance. This also requires swift actions to close positions or add collateral to improve the potential liquidation threshold. Today, most major blockchains host one or several live perpetual protocols. Whether based on AMMs or order books, these protocols often boast significant liquidity, enabling them to handle multi-million dollar positions without incurring high price impact costs.

Lending Protocols: Akin to spot margin positions in trading, lending protocols allow users to lend one coin and borrow another in an over-collateralized manner. This enables users to short or long any pair supported by the protocol. For example, to long BTC-USD, one could lend WBTC and borrow a stablecoin like USDC at a safe loan-to-value ratio, such as 50% of the WBTC's value. Although this approach is less capital efficient than derivatives protocols, it benefits from lower and more stable borrowing rates.

However, leverage in lending protocols is limited compared to derivatives protocols, typically offering leverage up to 3-5 times the value of the collateralized coins.

Another advantage is the use of price feeds from oracles to incur liquidations, which allows to get a weighted mix of different price feeds that might be sourced from different centralized exchanges. These aggregations smooth out any potential extreme price movements that might be experienced momentarily in certain venues, which could trigger numerous liquidations if they would not be aggregated and weighted.

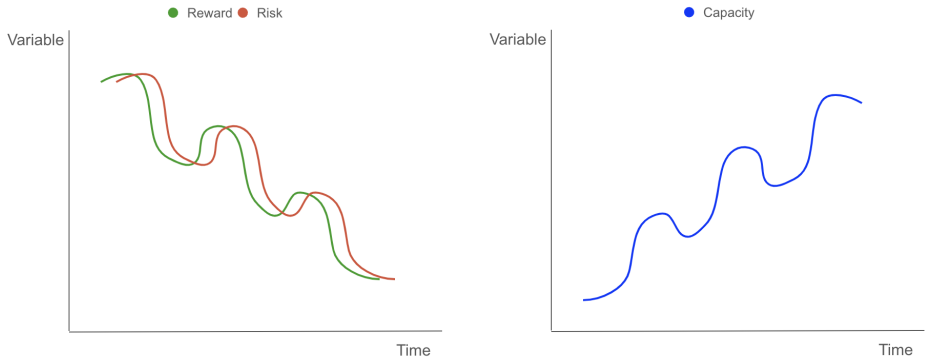
Another positive point on accessing leverage through lending markets is that the whole liquidity of DEXs in the chain can be used for the swap out of the borrowed assets that is needed to access leverage (by what is known as “looping"). This increased liquidity enables them to assemble positions of over $10M or more without incurring large price impact costs. The management of the health ratio on collateralized positions is slightly more complex than in derivatives protocols, requiring a thorough understanding of DeFi dynamics and the specific interest risk model parameters that each coin of the lending protocol might have. Due to these limitations, we believe that this hedging option is not yet widely adopted. However, in the future, adoption may increase due to the larger position sizes it enables and the lower costs associated with opening a short position in assets like WBTC and WETH against USD.

Collateralized Debt Positions (CDPs): Similarly to lending protocol, CDPs can be used to lock in collateral and borrow a coin against it (usually stablecoins). This strategy also enables liquidity provision while retaining exposure to the underlying asset. If the coin borrowed/minted is a stablecoin, the yields offered in other DeFi protocols for stablecoins can greatly improve the performance of the portfolio. The risk management model required to access hedging through CDPs is similar to the challenges found in lending protocols. It is worth keeping in mind that the different mechanics of each CDP protocol might vary greatly, and familiarity with their liquidation engines and interest rate models is a must to keep positions healthy, avoiding liquidation, after large price movements of the collateral or loaned coins.

By implementing these strategies, investors can enhance their resilience against the inherent uncertainties of the DeFi space, safeguarding their investments and optimizing their returns.

Anticipating the Future: DeFi's Evolving Dynamics

Understanding DeFi is a complex endeavor. The dynamics at play also vary over time making matters more difficult. However, the core pillars of risk, reward and capacity should continue to serve as a way to evaluate DeFi from first principles, even as trends evolve. The values for these variables are likely to follow a cyclical pattern as crypto is still a nascent technology exposed to the ebb and flow of human nature.



ITB Paper Charts 3A and 3B

Over long-term horizons, the rewards that can be materialized in DeFi decrease over time. This is a function of the market getting larger and more efficient. There are periods of increased yield coming from renewed interest in the space, usually tied to new products or upgrades being launched. However, as rewards spike, it also encourages people to take greater risks, which eventually end up decreasing rewards.

Risks in DeFi have been trending lower over time, as we discussed in the introduction with the value lost to exploits falling as the space matures. There are periods of increased risks during bull markets, where risk appetite is greater thus incentivizing projects to launch faster and less polished versions. Copycats also tend to rise promising marginal improvements over their competitors, but typically not focusing as deeply on risk management. These lead towards greater risks momentarily until markets eventually flush out excesses during bear markets and both risks and rewards decrease.

Capacity, on the other hand, should trend up cyclically over time. During the initial periods of high returns, the capacity that can be deployed into DeFi will rise. This creates a positive feedback loop where valuations of projects rise as more liquidity flows into them, thus increasing the value of incentives provided and resulting in even more capital inflows. In bear markets, as leverage is flushed out, liquidations occur and appetite for DeFi yields decreases, leading to lower levels of capacity. Then more protocols and integrations launch, slowly reviving interest in DeFi and ultimately resulting in higher highs over time.

Bootstrapping Metas

Historically, these cycles have been propelled by new forms of bootstrapping projects. In 2017 we had ICOs, in 2021 yield farming, NFTs and airdrops, and in 2024 so far points have broken out as a standout mechanism to attract

capital.

Factor	ICOs	Yield Farming	NFT Mints	Airdrops	Points
Direct Investment	Yes	No	Yes	No	No
Recovery of Initial Capital	No	Yes*	No	Yes	Yes*
"Ruggable"	Yes	No*	Yes	No*	No*
Dynamic	No	No	No	No	Yes
Retroactive	No	No	No	Yes	No

** Under most circumstances*

IntoTheBlock

ITB Paper Chart 3C

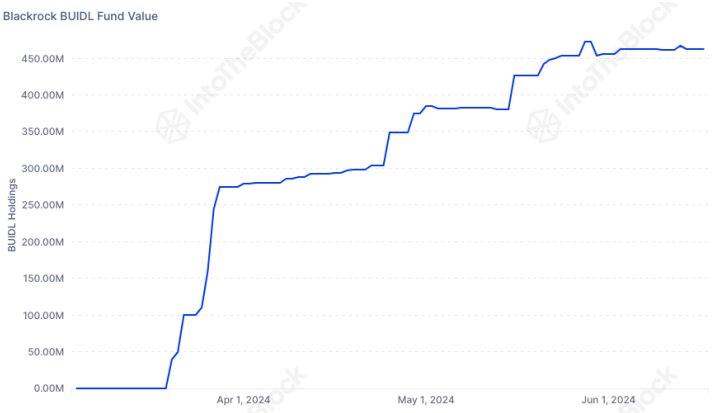
Over time, the market will continue to evolve as a) protocol teams find more suitable options to grow and b) regulations force changes in the industry. However, since the marginal cost of minting tokens is near zero, it is almost certain that projects will continue finding creative ways to use them to incentivize user growth.

Bridging with TradFi

Until 2023, DeFi and TradFi grew as separate silos with very little interaction between these systems. In 2023, increasing treasury rates led to the demand for these to be integrated within DeFi. This created a flurry of protocols to enter the "real-world asset" (RWA) space.

RWAs have so far been limited mostly to offering treasury yields on-chain, but more use-cases are being explored leveraging the unique characteristics of blockchain. Being on-chain, anyone can hold assets such as sDAI which make access to treasury yields easier than ever.

It is not only the DeFi protocols that are converging with TradFi, Wall Street's almighty Blackrock has also been increasingly involved in the onchain economy (though not in a decentralized manner). Blackrock's BUIDL fund offering treasury yields onchain has amassed over $450M in deposits within just a few months of launching.



Source: IntoTheBlock Blackrock BUIDL Perspectives

The BUIDL fund reduces settlement times for people trading this instrument from days to minutes. It reduces friction and the amount of intermediaries taking fees in settling transactions in today's opaque system. Through tokenization, a larger and larger share of the economy will happen through blockchain rails.

Another example of this trend is PayPal's PYUSD stablecoin, which has a market cap of over $400 million.

Source: IntoTheBlock PYUSD Financial metrics

PYUSD is even more integrated within the DeFi economy, with liquidity providers being able to supply it into decentralized exchanges like Curve and Uniswap, and even borrow it through lending protocols like Aave -- all in a self-custodial, instant and transparent way.

Will centralized companies take PayPal's approach of offering services on top of decentralized protocols, or will they follow the permissioned path through KYC like BlackRock has so far? The answer is unclear, but in either case the financial system is poised to be increasingly onchain.

Closing Thoughts

There are still many unknowns in DeFi. As new protocols and mechanisms are launched, it is worth approaching these from first principles as discussed throughout this paper. Consider the different risks that a protocol is exposed to, the sources of yield for rewards provided and the capacity you can deposit. Evaluate ways to mitigate risks and look at the big picture when looking at the DeFi space.

ITB is devoted to growing the onchain economy. Through our *Market Intelligence*, *DeFi Smart Yields* and *DeFi Risk Radar* products, we aim to tackle different challenges for the industry. It will not be an easy road, but we are glad to have you with us. Thanks for taking the time to read this. Feel free to reach out to the ITB team if you have any questions or feedback.

None of this constitutes financial, investment or tax advice.