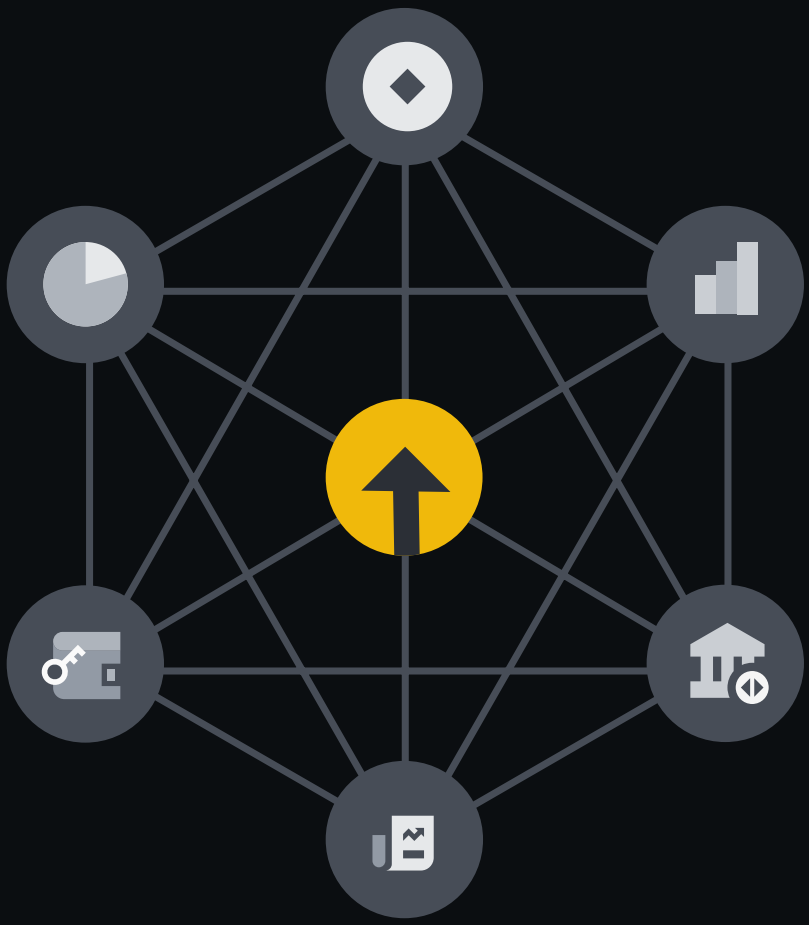
BINANCE
RESEARCH

Breakthrough DeFi Markets

MAY 2024



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1 Key Takeaways

- 2024 has seen a substantial influx of capital into DeFi, driving the total value locked ("TVL") up 75.1% year-to-date ("YTD") to US$94.9B, from US$54.2B at the year's start. This boost has benefited nearly every DeFi sector, across both major and niche markets, leading to the emergence of differentiated markets that are making previously inaccessible financial primitives available on-chain.

- After a 148.6% increase to US$9.1B this year, Yield is now the 8th largest DeFi market by TVL. Leading the push to bring interest rate derivatives on-chain, Pendle has seen a remarkable 1962% growth YTD to US$4.8B, benefitting from the rise of yield-bearing assets and increased rate volatility spurred by liquid restaking and speculative point systems.

- The circulating market cap of stablecoins has reached US$161.1B this year, the highest in nearly two years. Capitalizing on a market gap for a more capital efficient yield-bearing stablecoin, Ethena has surged 2730.4% to a US$2.4B market cap, becoming the 5th largest stablecoin. Its unique delta-neutral strategy, combining staked ETH and perpetual futures funding rates, has provided a distinct advantage.

- Money markets have grown this year, with on-chain TVL up 47.2% to US$32.7B. The demand for more flexible lending products, such as those that can incorporate long-tail assets as collateral, has fueled interest in modular lending. Morpho has responded with Morpho Blue and MetaMorpho, which combine the simplicity and pooled liquidity of traditional lending with the efficiency and flexibility of isolated markets, attracting billions in deposits in just a few months.

- Prediction markets reached a new peak this cycle, with TVL hitting a record US$55.1M after a 57.7% rise YTD. Historically thriving on political events, and with U.S. elections in sight, Polymarket has seen a significant resurgence, with average monthly volumes soaring from US$6.1M in 2023 to US$42.0M in 2024.

- The market upswing has revitalized on-chain derivatives activity, propelling average daily volumes from US$1.8B last year to US$5.4B this year. Hyperliquid has capitalized on this trend to increase its market share to 18.9%, making it the second largest by trading volume, trailing only dYdX. Its edge stems from being a high-performance, fully on-chain perps DEX on its own L1, providing CEX-like experiences and unique products like pre-market offerings and exotic pairs.

2 The Big Picture

The resurgence of markets is here, and with it has brought interesting developments in the decentralized finance ("DeFi") space. Notably, the broad market rally has been accompanied by a substantial influx of capital into DeFi, pushing the total value locked ("TVL") to US$94.9B this year, up from US$54.2B at the start of the year, reflecting a strong 75.1% year-to-date ("YTD") rebound. Interestingly, when considering DeFi Dominance, which measures the DeFi market cap as a percentage of the global crypto market cap, the same trend cannot be ascertained[1]. This suggests that while DeFi has captured more on-chain liquidity, the sector's public market valuations have yet to catch-up with the wider crypto market.

Figure 1: DeFi TVL has experienced a 75.1% increase this year, reaching US$94.9B

Source: DefiLlama, The Block, Binance Research, as of May 20, 2024

What's particularly telling is the continued commitment of capital, amounting to billions of dollars, which underscores the robustness of DeFi. When examining the distribution of this capital, it's evident that nearly every DeFi sub-sector, including smaller ones, has experienced notable growth this year. Gone are the days when only sub-sectors like Decentralized Exchanges ("DEXes") were the primary drivers of DeFi markets. This diversification is fundamentally crucial if DeFi is to meet its ambitious revenue forecasts, such as the projection of US$231.2B by 2030[2]. Achieving this requires the development of a diverse array of markets capable of unlocking new financial primitives, enabling users to maximize the value they derive from DeFi.

Figure 2: Nearly every DeFi sub-sector has experienced a notable influx of capital in 2024

Category	TVL (US$B)	YTD (%)	Project Count
Liquid Staking	48.0	47.0	169
Lending	32.7	47.2	408
Bridge	25.4	79.5	69
DEX	20.6	39.8	1310
Liquid Restaking	11.4	3963.8	16
CDP	9.6	0.1	141
Yield	9.1	148.6	481
Derivatives	3.2	76.0	240
RWA	6.8	17.8	43
Prediction	0.06	57.7	45

Source: DefiLlama, Binance Research, as of May 18, 2024

This raises a simple question: what are the next frontiers of DeFi to achieve this? Fortunately, it's not just an influx of capital we're seeing, but also positive trends across various markets. These include the emergence of narratives like on-chain interest rate derivatives, innovations in modular lending, new yield-bearing stablecoin and perpetual DEX models, as well as the resurgence of previously underperforming areas like prediction markets. The most intriguing outcome of this trend is the emergence of protocols that are changing how we perceive these markets. Hence, these breakthrough markets and protocols warrant exploration, as they are poised to play a crucial role in DeFi's next phase of growth.

Although Restaking and Liquid Restaking have emerged as leading market narratives this year, they will not be covered in this report, as they are extensively discussed in our recent publication, The Hitchhiker's Guide To Restaking. Instead, this report will explore five DeFi markets that have shown notable growth this year and examine the major protocols driving advancements in these markets.

Please note that the mention of specific projects in this report does not constitute an endorsement or recommendation by Binance. Instead, the projects cited are merely used for the purpose of illustrating the aforementioned concepts. Additional due diligence should be taken to better understand the projects and associated risks.

3 Yield Market

The yield market has emerged as a major DeFi sub-sector this year, growing by 148.6% to reach US$9.1B in TVL. This marks a significant breakthrough for a market that has not been in the spotlight over the past few years. Given that yield trading has been one of the most underdeveloped and underexplored areas in DeFi, its recent growth isn't surprising, especially considering its crucial role in traditional finance ("TradFi"). **In TradFi, interest rate derivatives, a comparable market, exceed US$400T in notional value**[3].

The sheer size of interest rate markets in TradFi represents a significant opportunity for DeFi, especially as there's a growing on-chain appetite for trading and speculating on yield products. Yield trading can be particularly attractive as it provides **greater market depth** and a **broader selection of strategies** for traders to express their views on the market.

Figure 3: After growing by 148.6% to US$9.1B this year, Yield is now the 8th largest DeFi market by TVL

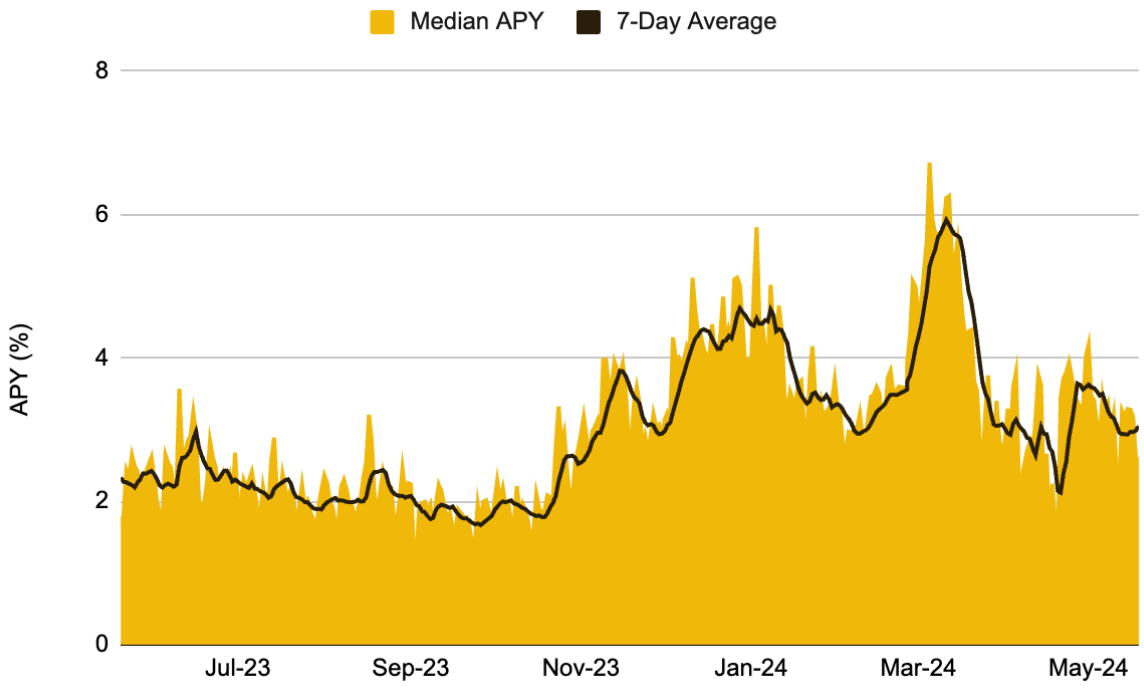
Source: DefiLlama, Binance Research, as of May 20, 2024

The growth of on-chain yield-bearing assets and their underlying volatility has significantly influenced the development of yield markets. These markets thrive on the synergies created by the growing influx of yield-bearing products. As more sophisticated yield-bearing products and strategies enter crypto markets, interest rate derivative protocols can build on these use cases. This trend is particularly noticeable with the rise of

narratives with new sources of on-chain yield, such as the tokenization of real-world assets and liquid restaking.

Simultaneously, the shift to higher yields observed in lending protocols and yield-bearing stablecoin providers is likely generating increased interest in trading yields within on-chain money markets. The current market upswing brings additional tailwinds, including yield volatility, more diverse yield sources, and greater participation, thereby creating a larger market space for the yield market to flourish.

Figure 4: The past year has seen on-chain median interest rates rise, bringing with them increased rate volatility



Source: DefiLlama, Binance Research, as of May 20, 2024

Pendle

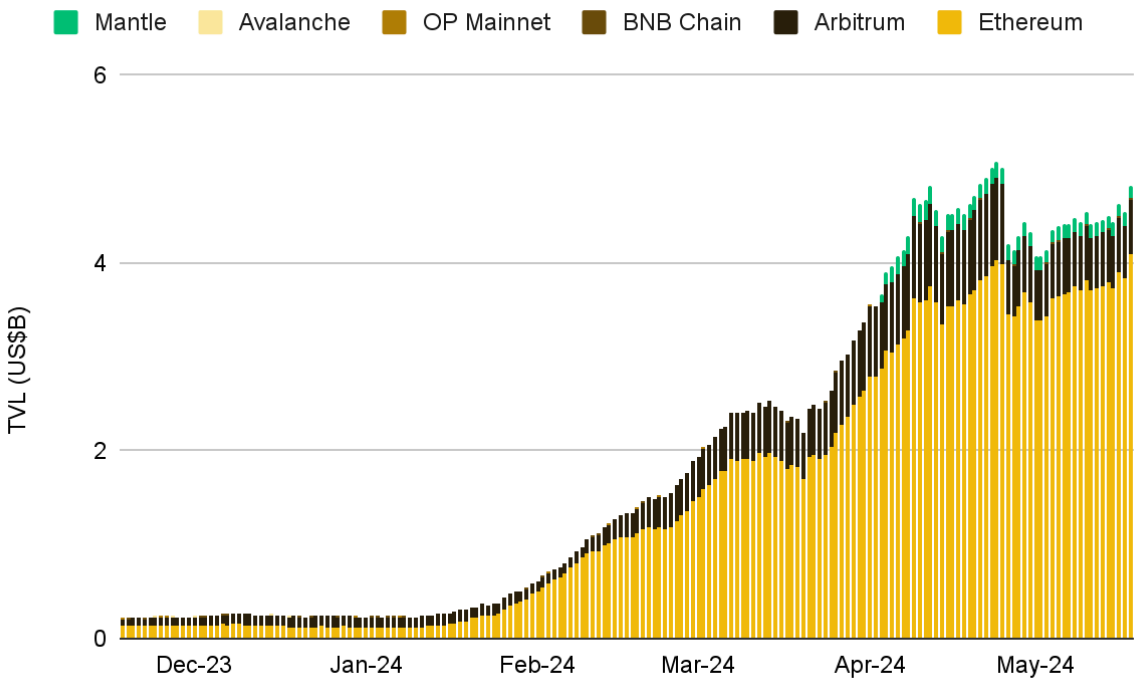
Pendle is an on-chain yield trading protocol that has been at the forefront in bringing the interest rate derivatives market into DeFi. It **democratizes access to yield markets**, allowing users to speculate, arbitrage, hedge, or execute advanced strategies to earn fixed yields, leverage the yield of an underlying asset, or employ a mix of these strategies. In essence, Pendle can be considered the **'Uniswap of the interest rate market'**.

In the current cycle, two trends have emerged with strong product-market fit: demand for leverage and yield. In DeFi, every liquidity pool offers a source of yield, whether through staking, swap fees, or yield strategies. Where there is liquidity and yield, a Pendle pool can be established. **By building on top of various projects and not relying on a single ecosystem or yield source, Pendle has captured network effects and delivered value to**

both users and projects. Users can trade yield in previously unavailable ways while earning from diverse sources. Simultaneously, projects behind the underlying assets can leverage Pendle to attract more TVL.

Pendle's TVL has seen continuous growth since the beginning of the year, increasing by an impressive 1962% year-to-date to reach US$4.8B. This achievement not only makes Pendle the leading yield trading product but also positions it as the 7th largest DeFi project by TVL[4]. While Pendle's primary success has been on Ethereum, its **multi-chain presence** on networks like Arbitrum and Mantle has also contributed to its growth, **embedding its yield trading product and unlocking synergies across multiple DeFi ecosystems**.

Figure 5: Pendle has seen remarkable growth since the start of the year, skyrocketing by 1962% to US$4.8B in TVL, firmly establishing itself as the leader in the yield market



Source: DefiLlama, Binance Research, as of May 18, 2024

How Pendle Decomposes Yield

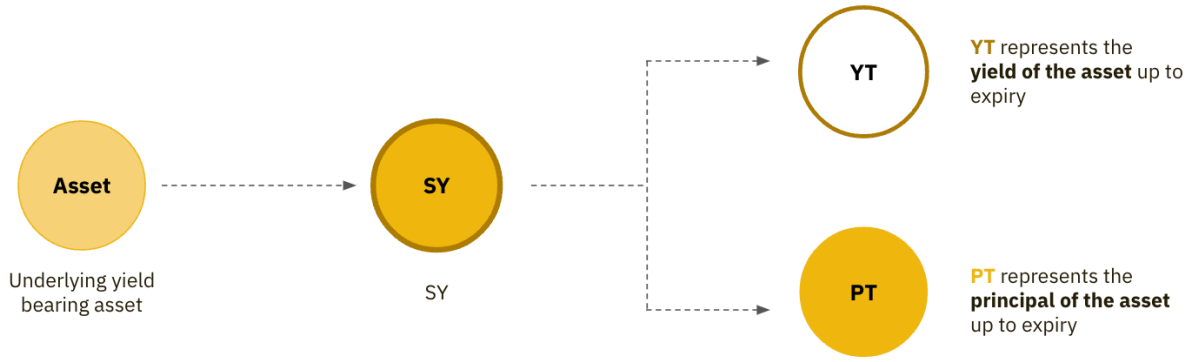
By creating an **on-chain marketplace for yield**, Pendle has effectively brought a new way for users to interact with yield-bearing assets. But how does it do this? Pendle implements a **novel method to split and trade yield-bearing assets** whilst ensuring there is adequate liquidity and incentives for its markets. Let's take a closer look at the components that make up Pendle's solution.

- Yield Tokenization: **Pendle tokenizes yield-bearing assets (any asset that generates yield) into standardized yield ("SY") tokens**. These SY tokens represent a standardized token format, wrapping various yield-bearing assets into a common interface that is widely composable[5]. **Each SY position is then split into two**

separate components: the principal token and the yield token. This separation, similar to bond stripping in TradFi[6], is what enables users to engage in new on-chain strategies for fixed income or to speculate on yield fluctuations.

- **Principal Tokens ("PT")**: **PTs represent the original investment capital without the future yield**[7]. Holding a PT means you expect to reclaim your principal at maturity without the yield it generates over time. Since the yield component's value is separated, PTs can be acquired at a discount relative to their underlying asset, creating an implied fixed rate of return. PTs are typically utilized in conservative strategies, allowing users to hedge exposure by locking in a fixed yield rate.
- **Yield Tokens ("YT")**: **YTs represent the future yield of the underlying asset until maturity, trending towards zero value as they approach maturity**[8]. Holding a YT involves speculating on rising yield rates, with returns dependent on fluctuations in the underlying APY. Since YTs are typically cheaper than the underlying asset, purchasing YTs provides leveraged yield exposure.

Figure 6: Pendle tokenizes yield-bearing assets by splitting them into their yield and principal components



Source: Pendle Documentations, Binance Research

- **Yield Trading**: **Pendle's Automated Market Maker ("AMM") serves as the main engine for yield trading**[9]. It supports SY tokens and facilitates trading of both PT and YT. **Liquidity on Pendle comprises a single AMM pool of PT and the underlying asset**. Swapping PT involves trading between the two assets in the pool, while YT swaps are enabled through flash swaps in the same pool. The relationship between PT and YT prices is maintained by ensuring:

PT Price + YT Price = Underlying Asset Price

The above relationship indicates that the sum of PT and YT should equal the underlying asset price, with PT and YT prices inversely correlated. The specific price ratios of PT and YT are influenced by general market forces and yield fluctuations in DeFi.

Liquidity providers ("LPs") are incentivized to provide liquidity on the Pendle AMM in exchange for earning swap fees, protocol incentives, and various forms of yield. Pendle V2, in particular, brought about significant improvements in the AMM design and LP experience. It improved the correlation between pool assets, reducing the impact of impermanent loss for LPs. Instead of depositing YTs, which is not constant due to supply and demand forces, LPs now provide PTs and the underlying assets, both of which are closely correlated.

Pendle also features an order book system alongside its AMM, enabling peer-to-peer ("P2P") trading of PT and YT[10]. This allows users to place limit orders at specified market prices.

- Governance: **Pendle's governance model is anchored by Vote-escrowed Pendle ("vePENDLE")**, inspired by Curve's veTokenomics[10]. This mechanism incentivizes users to hold and stake PENDLE for extended periods, rewarding them with vePENDLE tokens. vePENDLE holders enjoy voting rights and the ability to channel incentives, as well as receiving protocol rewards, LP boosts, and a healthy share of Pendle's revenue from yield and swap fees[11]. This strategy aligns user interests with Pendle's long-term goals.

  Given that Pendle operates as an AMM and deals with various long-tail assets, the vePENDLE model has been **crucial in bootstrapping and incentivizing liquidity**. Notably, Pendle has attracted external protocols like Penpie, Equilibria, and StakeDAO, which have acquired vePENDLE holdings. Similar to what Convex is to Curve, these protocols aim to accumulate PENDLE to gain voting power and maximize rewards. Collectively, these liquid lockers have contributed significantly to Pendle's liquidity.

Ultimately, Pendle's architecture allows it to **effectively leverage DeFi's composability without becoming overly dependent on a single project** or exposing itself to associated risks. The protocol can build yield pools on top of virtually any liquidity source. Simultaneously, Pendle does not overshadow the TVL or adoption of underlying projects; instead, it enhances them by tokenizing their yield-bearing assets. This yield-tokenization process creates arbitrage and hedging opportunities, opening the doors to new types of investors.

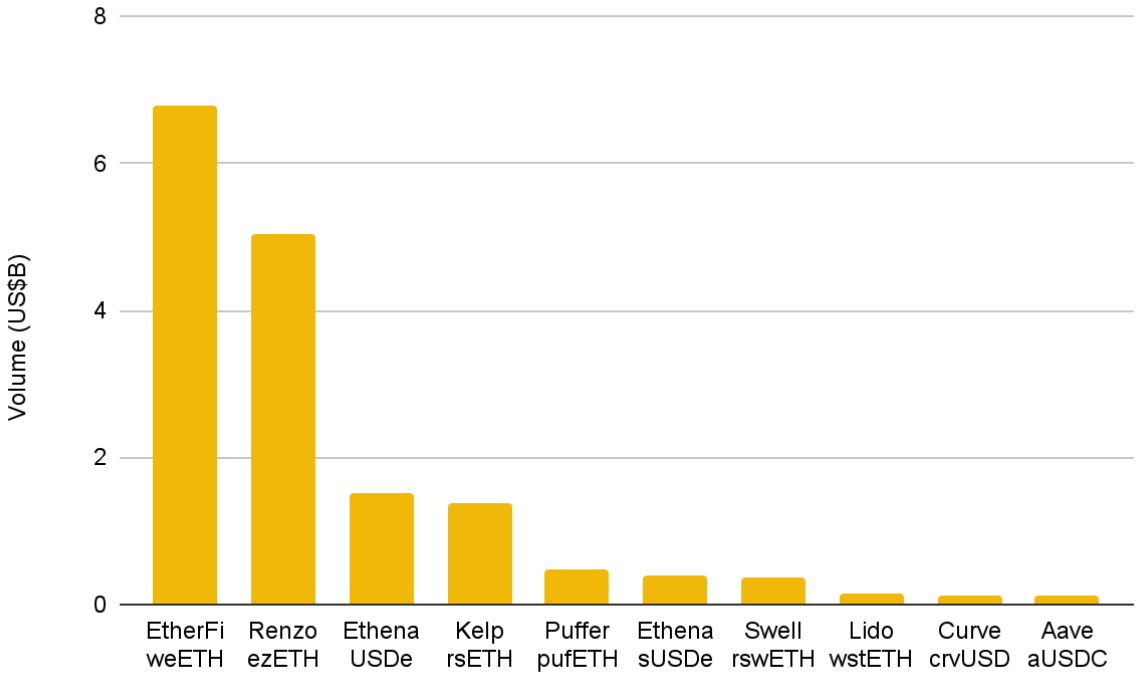
Pendle's ability to adapt to changing market conditions positions it uniquely to capitalize on prevailing trends. Whether in bull or bear markets, users can leverage Pendle to optimize their yield strategies. As Pendle continues to launch new pools, deploy on different chains, and tokenize new yield sources, it is becoming a liquidity hub across various sectors, including Liquid Staking Tokens ("LSTs"), DEX Liquidity Pools, Real-world Assets ("RWAs"), and more recently, Liquid Restaking Tokens ("LRTs").

Capitalizing on Liquid Restaking and Points

Beyond its product, Pendle's success has also stemmed from **strategic business development**, **establishing partnerships with a variety of protocols aligned with the latest market narratives**. A recent example of this is Pendle capitalizing on LRTs and points.

Initially, yield protocols primarily focused on stablecoin pools in money markets, which did little to generate substantial volume. This scenario changed with the **growth of organic on-chain staking yields and LSTs**, allowing Pendle to tap into the largest market in DeFi by TVL. The **subsequent progression of restaking and LRTs** further expanded Pendle's addressable market size. Pendle entered the LRT space with an incentivized pool for EtherFi earlier this year, and the results were impressive: within a week of launching, EtherFi's eETH became the largest pool on Pendle. **This success underscored the market appetite for LRT yield and highlighted Pendle's value as a key liquidity destination for LRTs**. Consequently, other restaking projects soon followed by launching their own pools on Pendle.

Figure 7: Four of the top five volume generators on Pendle this year are LRT pools



Source: sentio.xyz, Binance Research, as of May 18, 2024

Tapping into LRTs has easily been the largest catalyst, not just by providing another market to explore but by **attracting a new segment of users interested in speculating on airdrops**. By supporting LRTs' points programs, Pendle has significantly increased liquidity and trading volumes. **Their strategy of creating a separate points trading platform demonstrates their ability to capitalize on the latest market trends**. Users can speculate

on future airdrops by earning EigenLayer and LRT points while also benefiting from ETH staking rewards, restaking yield, Pendle incentives, swap fees, and more. This approach not only attracts users but also provides protocols with additional utility and an extra source of liquidity.

Points trading on Pendle mirrors yield trading but includes the addition of points. Points are treated similarly to the yield component. YT represents the underlying floating yields plus points, while PT offers a fixed yield in exchange for foregoing all floating yields and points. **Pendle has further enhanced this model by partnering with various protocols to offer points multipliers**, providing additional incentives for users to deposit their assets into a Pendle pool.

It can be said that the trajectory of **Pendle's growth is closely linked to activities in other market sectors**, highlighting its dependence on the broader DeFi landscape. So far, Pendle has heavily relied on the development of the LRT market. While LRTs have significant growth potential, especially with the introduction of Active Validator Services ("AVS"), a negative demand shock could occur once the speculative interest driven by points and airdrop campaigns diminishes. **A critical consideration for Pendle will be its ability to expand its business scope and attract similar levels of liquidity beyond LRTs and points**.

Despite this, **Pendle's ability to cater to the entire market of yield-bearing assets positions it well to capture the emergence of other DeFi primitives**. The successful adoption of LRTs and points, along with the **liquidity and distribution benefits** Pendle provided to LRT projects, should help attract projects from other ecosystems. Pendle's versatile product design enables it to adapt and thrive amidst evolving market conditions, continuing to offer compelling yield opportunities regardless of the macro environment.

Use Cases and Opportunities

Pendle's extensive addressable market stems from its ability to tap into a diverse range of yield types. While Pendle has done remarkably well in unlocking several new use cases, there continues to be a much greater opportunity in a number of areas, including sitting at the intersection with other DeFi protocols and other blockchains.

- **Pendle x Staking**: Staking is unequivocally the largest market for on-chain yield and it's not surprising that this has generated the strongest value and use case for Pendle. The emergence and growth of several layers built on top of staking, such as liquid staking and liquid restaking, have attracted substantial capital, becoming the largest sub-sectors in DeFi. This growth has trickled down to Pendle, as users speculate on the yield volatility of their LST and LRT collateral.

  Currently, only about 27% of ETH is staked[13], with this figure expected to rise. The total TVL of liquid staking stands at US$48.0B, and with the addition of liquid restaking, this continues to present a significant opportunity for Pendle. Pendle's TVL only represents a modest penetration rate, leaving considerable room for

growth, especially as staking markets on other blockchains like BNB Chain, Bitcoin, and Solana expand. Hence, it's fair to say that staking will continue to play a key role in on-chain yield trading for Pendle.

- **Pendle x Points:** Pendle has achieved strong product-market fit by enabling users to speculate on points and airdrop farming opportunities through YTs. This ability to leverage speculation to create products not entirely based on yield has been a notable breakthrough. While demand from points trading has primarily come from the LRT track, points have been widely adopted across various projects, including SocialFi and Gaming, and on non-Ethereum Virtual Machine ("EVM") blockchains like Solana. This opens up opportunities for Pendle to capitalize on projects implementing point programs across multiple blockchains.

- **Pendle x Structured Products**: Pendle can capitalize on the emergence of unique yield-bearing products, such as Ethena's synthetic dollar. While theoretically classified as a yield-bearing stablecoin due to its USDe offering, Ethena's yield is derived from a combination of ETH staking yield and perpetual futures funding rates. Pendle can create a marketplace for users to speculate on the future returns of sUSDe, highlighting its ability to adapt to diverse yield sources.

- **Pendle x Money Markets**: Money markets like Aave and Compound offer their own forms of annualized returns, typically transacted via stablecoins[14]. The current TVL of on-chain lending is US$32.7B, presenting another significant sub-sector for Pendle to tap into. Additionally, since Pendle's PTs are closely correlated with the value of their underlying assets, they can be used as collateral. PTs are accepted in projects like Silo, Stella, Seneca, Dolomite, and Timeswap, but there is still untapped PT liquidity on Pendle. Using PTs as collateral to borrow funds while still earning fixed rate returns could further embed Pendle into deeper areas of DeFi.

- **Pendle x Liquidity Pools**: Liquidity pools, including Balancer pools and LP tokens like GMX's, are popular in DeFi for earning yield. Each pool has its own interest rate based on different strategies, creating a natural demand for trading yield variability. This forms another attractive market for Pendle, especially since almost all DeFi projects have LP token income.

- **Pendle x Real-World Assets:** With high interest rates, various yield-bearing stablecoins have emerged, offering on-chain exposure to treasury interest. Pendle has demonstrated its capability to create markets for these products, enabling users to trade on interest rate variability. As the tokenization of additional types of RWAs increases, Pendle can capitalize on the integration of more traditional financial products into the on-chain ecosystem.

There are also some key focus areas for Pendle going forward that are worth monitoring.

- **Fostering Institutional Adoption**: Pendle's current demand has so far come from advanced retail users, who typically use the product for leverage rather than traditional financial purposes like hedging. However, **Pendle is also working to attract larger-scale capital and sophisticated investors through its institutional team**. Institutions, with their greater liquidity, can drive significant value to the protocol and benefit from tailored investment strategies between fixed and variable yield options. **Much of this potential hinges on institutional adoption of on-chain yield-bearing assets**. A key development to watch is the approval of spot ETH ETFs, which would provide institutions with a gateway to hold ETH. The natural next step would be to stake ETH for additional on-chain income. Such developments could drive demand for products like Pendle to hedge risks and smooth yield curves.

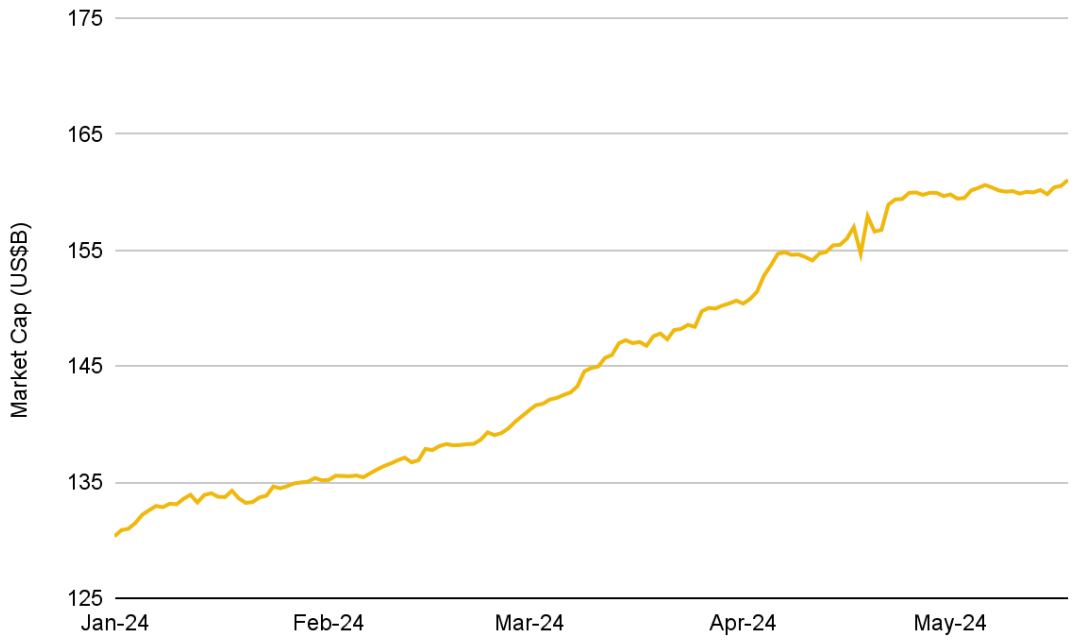
- **Increasing User Engagement**: While Pendle's main success has come from a segment of retail users, expanding its audience is challenging due to the complexity of yield trading. **Pendle is working on improving user experiences and enhancing user education to lower barriers to entry**. Simplified interfaces also allow easier integration with other projects and exchanges, including as a plug-and-play module, promoting wider use of Pendle. Initiatives like Pendle Earn, Pendle Academy, and Pendle Telegram Yield Bot have all helped to simplify the protocol's offerings.

- **Pendle V3**: Building on the success of Pendle V2, which introduced a custom AMM for trading yield and principal tokens, Pendle V3 is their next product iteration, slated for release by the end of 2024. While specific details are yet to be confirmed, Pendle V3 is anticipated to further innovate with new trading tools and margin trading for on-chain yields, enhancing capital efficiency and further unlocking use cases in the yield trading market, including at scale.

4 Stablecoin Market

Stablecoins are among the few DeFi use cases that have achieved meaningful product-market fit. They have proven to be effective financial tools and play a crucial role in both DeFi and CeFi. This is evident from the stablecoin market cap, which has surged to US$161.1B, its highest in two years. This growth shows no signs of slowing down, particularly in the current high interest rate environment, which has made the stablecoin business highly attractive. Tether's record profit of US$4.5B in Q1 this year highlights this trend[15]. It's no surprise that major players, from crypto-native Ripple[16] this year to fintech provider PayPal[17] last year, are tapping into the sector.

Figure 8: The circulating market cap of stablecoins has been trending upward this year, reaching US$161.1B, the highest level in nearly two years



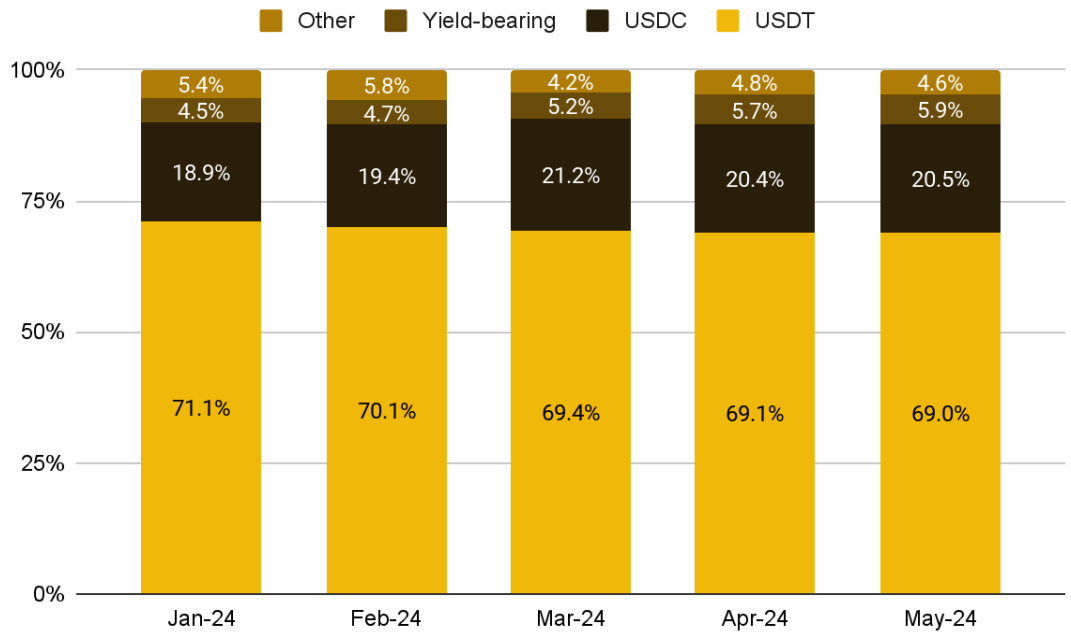
Source: DefiLlama, Binance Research, as of May 18, 2024

Currently, the stablecoin market is dominated by centralized players, with Tether's USDT and Circle's USDC capturing about 90% of the market share. Their success is largely due to their deep integration and composability with various markets, generating strong liquidity network effects and creating higher barriers to entry for new players. **This shows that, despite its vast size, the stablecoin sector is far from perfectly competitive**.

For instance, interest generated by stablecoins like Tether doesn't accrue to the holders. With the recent market resurgence and the availability of higher risk-free rates, **yield is becoming an increasingly important attribute** for stablecoin users. At the same time, the majority of market liquidity is controlled by centralized entities, which undermines the notion of stablecoins as crypto-native assets. Hence, there has been a long-standing gap in

the market for a more decentralized and yield-bearing stablecoin. The growing demand for such assets is emerging as a key narrative this year, as evidenced by their increasing month-over-month ("MoM") market share.

Figure 9: Yield-bearing stablecoins have shown consistent MoM growth, reaching a market share of 5.9%, yet still have considerable room for growth



Source: DefiLlama, Binance Research, as of May 18, 2024

Stablecoin models have previously emerged to address this demand, notably those backed by RWAs and collateralized debt positions ("CDPs"). Initially, RWA-backed stablecoins were attractive because they offered TradFi yields to holders. However, their appeal has waned as the market became saturated with competing solutions and as crypto-native yields began to exceed treasury yields. Conversely, CDP-backed stablecoins have struggled with over-collateralization, leading to capital inefficiencies and scalability issues.

While these models have tried to challenge the centralized stablecoin duopoly by either bringing TradFi rates on-chain or leveraging DeFi rates via capital inefficient means, they have not fully succeeded. This is where Ethena steps in, addressing the market's need for a yield-bearing stablecoin that avoids scalability concerns with its novel approach.

Figure 10: While several types of yield-bearing stablecoins exist, including RWA, CDP, or combinations thereof, Ethena introduces a novel approach

	Centralized	RWA	CDP	Ethena
Yield-bearing	No	Yes	Yes	Yes

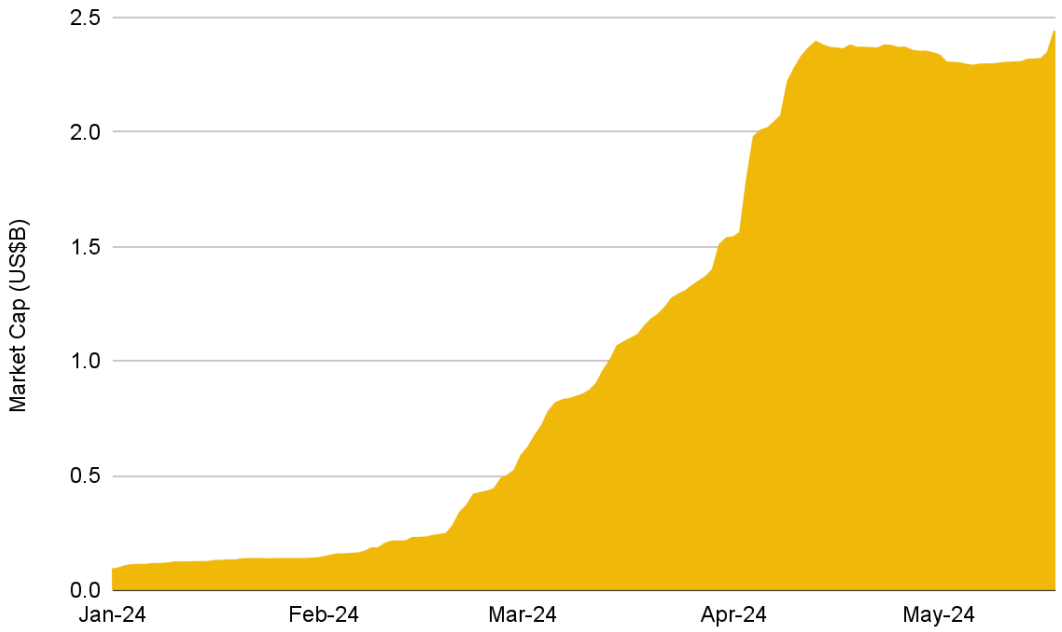
Market Cap (US$B)	148.5	0.9	6.1	2.4
Token	USDT, USDC, FDUSD	BUIDL, USDY, USDM	DAI, crvUSD, GHO	USDe
Source of Yield	Treasuries, Money Markets, Reverse Repurchase Agreements	Treasuries, Money Markets, Reverse Repurchase Agreements	On-chain Money Markets	Staked ETH, Perpetual Futures Funding Rates
Capital Efficient	Yes	Yes	No	Yes

Source: DefiLlama, Project Documentations, Binance Research, as of May 18, 2024

Ethena

Ethena's stablecoin, USDe, has rapidly scaled its circulating market cap to over US$2.4B in just a few months, making it one of the fastest-growing stablecoin assets. Its success is directly related to its unique approach to stablecoins as a synthetic dollar protocol. **By democratizing access to the delta-neutral trade, Ethena has been able to achieve early product-market fit and satisfy the market's strong demand for yield**.

Figure 11: In just a few months, Ethena's USDe has surged 2730.4% to reach a market cap of US$2.4B, making it the 5th largest stablecoin



Source: DeFiLlama, Binance Research, as of May 18, 2024

A particular catalyst for Ethena has been the effective execution of its airdrop campaign. Employing a points system known as shards, Ethena incentivized liquidity provisioning for USDe. At the end of season one, 5% of its native token supply was distributed to shard holders. With the rebranding of shards to sats, season two is underway, continuing to **incentivize users to provide liquidity on Ethena** and **interact with various on-chain money and yield markets**. This strategy has helped Ethena **maintain deep liquidity** across the DeFi ecosystem[18].

While these incentives have been successful in attracting and retaining users, the true test will come after the campaign ends. That is when the market will evaluate the **real risk of holding USDe without the boost from incentives or speculation**. One factor to consider is the native functionality of the ENA token, which is currently limited to governance. However, with the recent trend of revenue sharing and buyback/burn mechanisms in DeFi, Ethena may implement similar features in the future.

Regardless, if Ethena can successfully embed USDe across as many protocols, the **resulting network effects could make USDe adoption resilient even after incentives end**. The **uniqueness of the Ethena model** and the **provision of high yields** is also quite a **strong demand driver** on its own. Let's explore Ethena's model in more detail below.

The Delta-Neutral Strategy

At its core, **Ethena leverages the structurally high funding rates unique to perpetual futures markets, creating a fungible product** that integrates seamlessly with the rest of DeFi[19]. Unlike existing stablecoin models that use RWAs or CDPs, Ethena's USDe is backed by a delta-neutral ETH position. **Each USDe is collateralized by a long staked ETH (stETH) position, which is simultaneously offset by an equivalent short ETH perpetual futures contract (ETH-PERP)**. For example, if the price of ETH decreases, the short ETH-PERP position offsets the downward price movement. Conversely, if the price of ETH increases, the long stETH position covers the upward price movement.

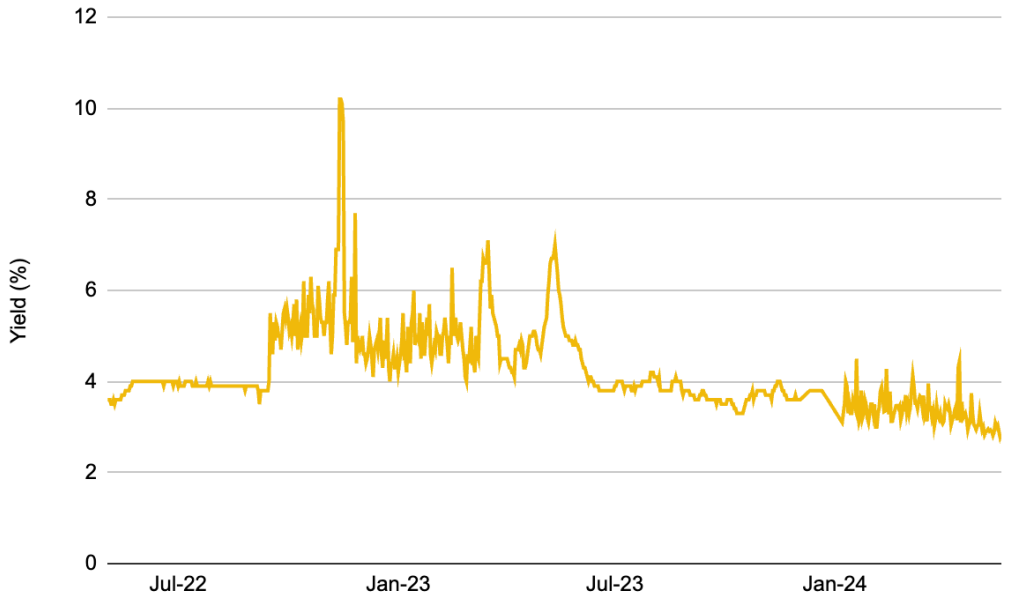
Recently, Ethena also onboarded BTC as additional collateral. Similarly, BTC is paired with an equivalent short BTC perpetual futures position (BTC-PERP) to maintain delta-neutral backing. The primary difference is that the ETH collateral can be staked to earn additional yield, while BTC cannot, at least for now.

Ethena's model offers several advantages over other yield-bearing stablecoins:

- **Capital Efficiency**: Ethena is more capital efficient than CDPs. **USDe's delta-neutrality means it doesn't require over-collateralization, needing only one dollar of collateral to mint one USDe**. This allows Ethena to scale more effectively than CDP stablecoins like DAI.
- **Yield Optimization**: **Ethena combines two of the highest yielding sources of crypto-native yield**. That is, yield from staked ETH and perpetual futures funding rates[20].

- **Staked ETH**: Staked ETH yields a competitive annual return of 3-4% based on historical averages. Given that liquid staking is the largest sub-sector in DeFi, it is one of the most attractive sources of on-chain yield.

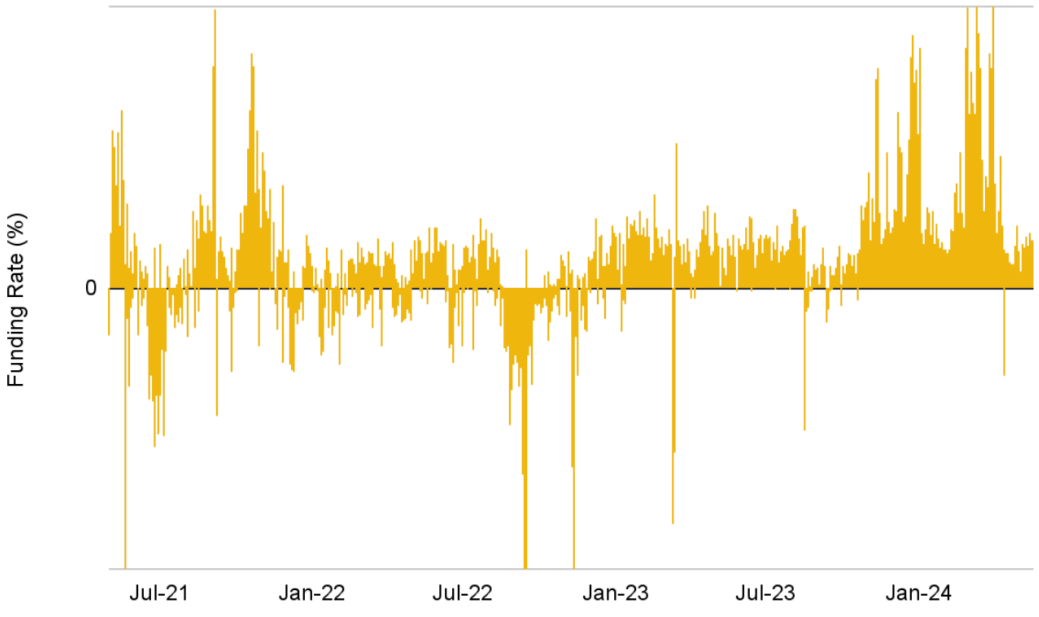
Figure 12: Since last year, ETH staking yields have trended toward the 3-4% range



Source: DefiLlama, Binance Research, as of May 19, 2024

- **Perpetual Futures Funding**: The majority of USDe's yield comes from the short position in perpetual futures. As ETH and BTC perpetual funding rates have generally been long-biased, those shorting this exposure have historically enjoyed lucrative funding rates.

Figure 13: ETH funding rates have typically skewed positive



Source: Glassnode, Binance Research, as of May 19, 2024

Design Mechanics

In terms of its stablecoin mechanics, Ethena follows common practices for minting, redemption, and staking, with a few unique twists. Notably, end-users do not handle the minting and redemption of USDe; this task is reserved for whitelisted authorized participants ("APs"). Users interact directly with liquidity pools or through Ethena's front-end, which routes transactions via these pools. To receive the yield generated by the underlying collateral, users must stake their USDe to obtain sUSDe via the Ethena front-end.

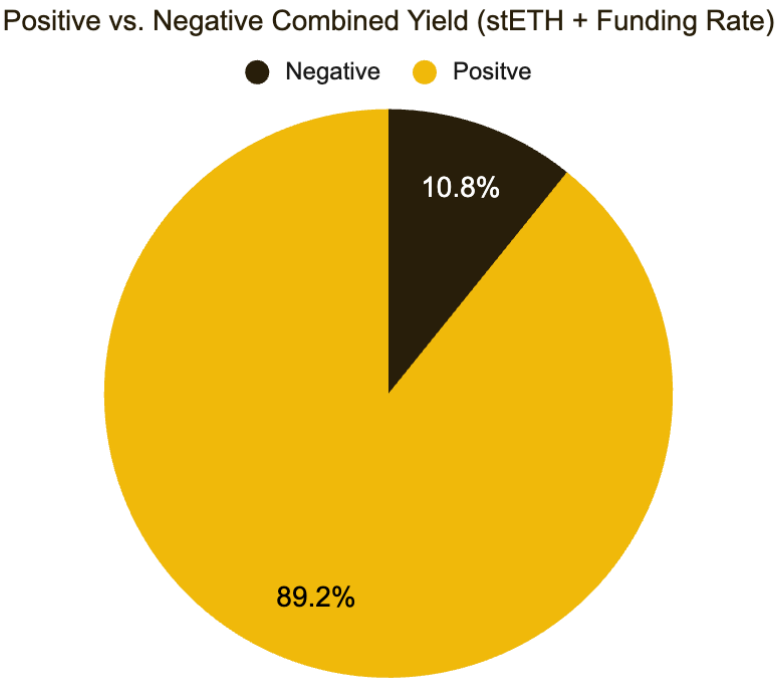
For APs, each transaction presents an arbitrage opportunity to rebalance liquidity pools[21]. On the backend, USDe is minted when APs deposit accepted collateral such as ETH, LSTs, BTC, and other stablecoins into Ethena. The protocol then routes this collateral through an internal swap function, purchasing staked ETH or BTC and pairing it with an offsetting short perpetual position on a CEX. Ultimately, this system ensures liquidity pools maintain a stable 1:1 swap ratio, while simplifying the minting and redemption process for end-users.

Structural Risks

Given its unique approach, **Ethena carries fundamentally different risk profiles compared to other stablecoins**. This distinction has led both Ethena and the market to label USDe as a synthetic dollar rather than a traditional stablecoin. This strategic categorization has allowed Ethena to leverage the network effects inherent in being an on-chain liquid monetary asset. At the same time, **Ethena has been quite transparent about the associated risks**. Below, we highlight some of these risks.

- **Negative Funding Rates**: **The biggest risk to Ethena is perhaps if funding rates were to turn negative**[22]. Perpetual funding rates in crypto markets have generally been long-biased, with negative rates occurring only 20.5% of the days over the past three years. However, since Ethena also uses stETH as collateral, it provides a margin of safety against negative rates. **The protocol's yield only becomes negative if the combined yield from ETH staking and funding rates turns negative**. This means that Ethena is concerned only when ETH funding is more negative than stETH yields, which has occurred approximately 10.8% of the time when considering the additional buffer from stETH yields[23].

Figure 14: Combining ETH staking and funding rates, yields were negative 10.8% of the days over the last 3 years



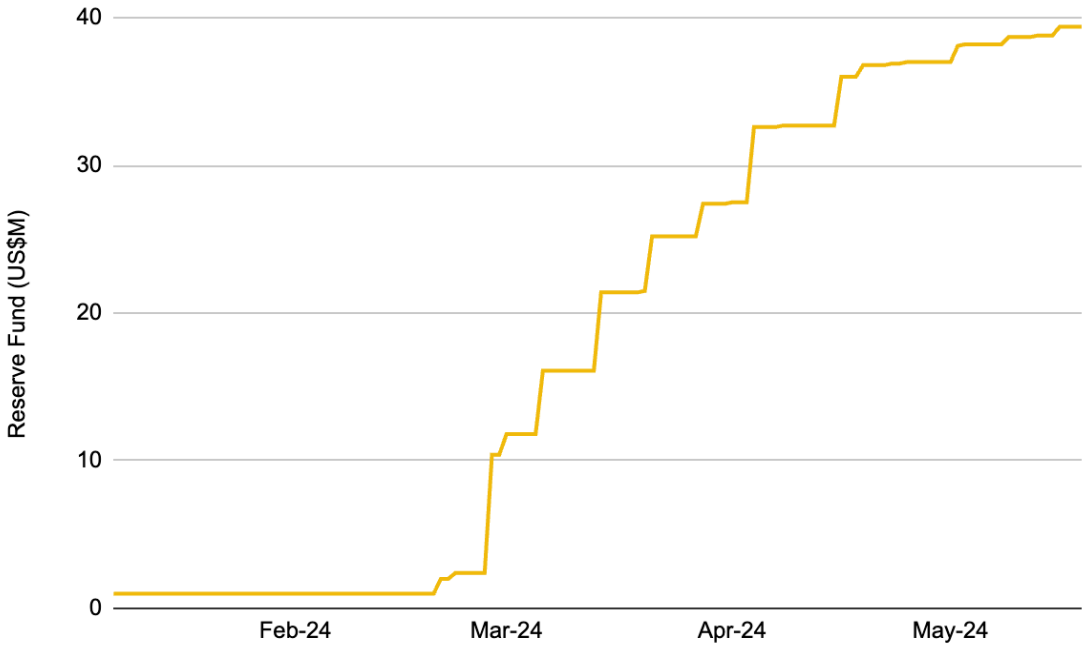
Source: Ethena Labs, Binance Research

However, past data may not be entirely reliable due to ever-changing market dynamics. The increasing **entry of institutions into the crypto space, who are likely to pursue their own delta-neutral strategies, could materially impact funding rates**, including those influenced by Ethena itself. Additionally, the approval of a **spot ETH ETF may alter Ethereum's demand and supply dynamics**. Therefore, historical data should not be the sole basis for predicting the true impact of funding rates on Ethena.

If funding rates do flip negative, Ethena would need to rely on its reserve fund to maintain USDe's 1:1 dollar peg. Questions linger on the adequate size of this reserve, especially if negative funding rates persist longer than expected. Unfortunately, this isn't a hard science; **Ethena's research suggests US$20M per US$1B of USDe** could withstand most bearish scenarios, while **Chaos Labs recommends closer to US$33M per US$1B USDe**[24].

A positive aspect for Ethena is that it does have significant revenue generation to tap into. As one of the most profitable DeFi protocols, Ethena allocates 80% of its revenues to the reserve fund. While Ethena has performed well in bullish market conditions, its resilience during extended bearish periods and negative funding rates remains to be seen.

Figure 15: The Ethena reserve fund has been steadily increasing, now at US$39.4M



Source: Ethena Labs, Binance Research, as of May 19, 2024

- **Custodial Risk**: **Ethena's design mechanism depends on CEXes and off-exchange settlement ("OES") providers**. CEXes handle the trading of Ethena's perpetual positions, while OES providers manage the custody and settlement of Ethena's collateral. **Although the incentives of these counterparties align with Ethena's, relying on external entities introduces inherent risks**.

  Ethena mitigates this risk by diversifying its counterparties and obtaining third-party attestations. It is important to note that this counterparty risk is not unique to Ethena and is common among stablecoins, including USDT and USDC. Unlike these centralized stablecoins, Ethena is not subject to censorship risks because it does not rely on traditional banking systems[25].

- **Collateral Risk**: **While market volatility can affect the value of Ethena's collateral, particularly ETH and BTC, a larger risk arises from the portion of collateral held as LSTs**. Less liquid LSTs could de-peg due to slashing events or liquidity shocks. That said, the LST would need to diverge considerably for the de-peg to significantly impact Ethena[26].

- **Smart Contract Risk**: Despite many of Ethena's operations occurring off-chain, the protocol is still **vulnerable to smart contract exploits** like other DeFi protocols. Ethena mitigates this risk through multiple audits and bug bounty programs.

- **Uncertain Territory**: Given Ethena's innovative and unique attributes, there is always an **underlying risk associated with new models and technologies**. Ethena is not immune to these uncertainties.

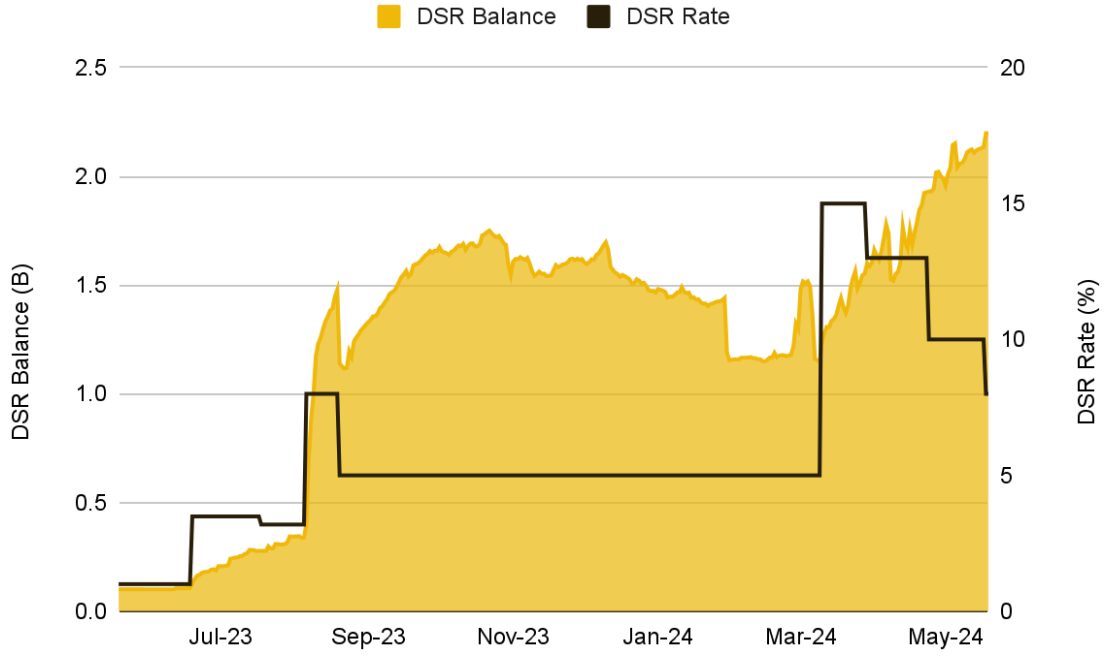
USDe Broader Market Impact

Everything aside, Ethena's model has broader market implications. Historically, yields in these sectors have varied greatly, with **notable differences among treasury bonds, on-chain money markets like the DAI Savings Rate ("DSR"), and delta-neutral trades**. Ideally, there should be some form of reconciliation between these rates, but this has not been the case. While treasury bonds and on-chain money market rates have begun to align as MakerDAO and other DeFi protocols incorporate RWAs, **the delta-neutral trade has remained relatively isolated**.

This isolation likely stems from the higher risks, complexity, and inaccessibility associated with delta-neutral basis trades. **Ethena addresses this by making delta-neutral trades more accessible to a wider audience, thereby broadening the user base that can benefit from these yields**. This democratization of access has significant implications, particularly in **recalibrating DeFi's baseline interest rates**, pushing other protocols to adapt.

- **DeFi Money Markets Raise Rates**: Ethena's impact has led to **strategic adjustments from DeFi protocols** like MakerDAO. For instance, MakerDAO increased the DSR from 5% to 15% to avoid DAI demand shocks and remain competitive with Ethena's higher yields. This adjustment was necessary to maintain the incentive for holding and staking DAI. Other protocols, such as Frax, have also made similar adjustments, signaling an early reconciliation of rates.

Figure 16: Ethena's competitive yield rates prompted MakerDAO to raise the DSR from 5% to 15% on March 8 to cushion against potential DAI demand shocks



Source: Dune Analytics (@steakhouse), Binance Research, as of May 19, 2024

- **Increased Exposure to USDe: Existing stablecoin issuers have sought to capitalize on Ethena's yields** by managing their own USDe/sUSDe markets through Morpho[27]. MakerDAO, for example, initially deployed 100M DAI via the Direct Deposit Module ("D3M") to Spark's sUSDe/DAI and USDe/DAI markets, later increasing this by an additional 100M DAI incrementally. This integration allows users to deposit sUSDe or USDe into these lending pools on Morpho and borrow DAI in return, fostering more demand for DAI and enabling MakerDAO to earn APY from borrowers. While this integration is beneficial, it also exposes MakerDAO to the risks associated with Ethena.

  In response to MakerDAO's increased allocation, other lending protocols, such as Aave, have adjusted their strategies. Aave recently passed a proposal to reduce the DAI liquidation threshold by 1% for every additional 100M DAI allocated through the D3M. This means that as the risk associated with DAI increases, Aave reduces its exposure accordingly.

5 Money Market

Money markets, which encompass lending and borrowing, have experienced notable growth since the start of the year, with on-chain TVL increasing by 47.2% to surpass US$32.7B. These markets are typically dominated by a few key players, such as Aave and Compound Finance, as well as protocols that can vertically integrate synergistic products like MakerDAO's SparkLend.

Figure 17: Money market protocols have experienced notable growth in TVL, increasing by 47.2% to reach US$32.7B

Source: DefiLlama, Binance Research, as of May 20, 2024

While these major players continue to lead the lending business, a shift is occurring that challenges the status quo of on-chain lending. There is **growing demand for a broader range of long-tail assets as collateral**, a need that traditional lending platforms have struggled to meet. Their underlying models and the significant liquidity they handle mean that adding new assets increases risks in their multi-asset pools. Managing these additional risks necessitate stringent risk management measures like supply and borrow caps, strict liquidation penalties, and conservative loan-to-value ("LTV") ratios, ultimately subjecting them to several efficiency and scalability constraints. At the same time, isolated lending pools, while more flexible, struggle with liquidity fragmentation and capital inefficiency.

This market gap has spurred the rise of modular lending protocols, which cater to a wider asset base and allow users to customize their risk exposure. These new protocols are beginning to challenge the dominance of established players like Aave and Compound.

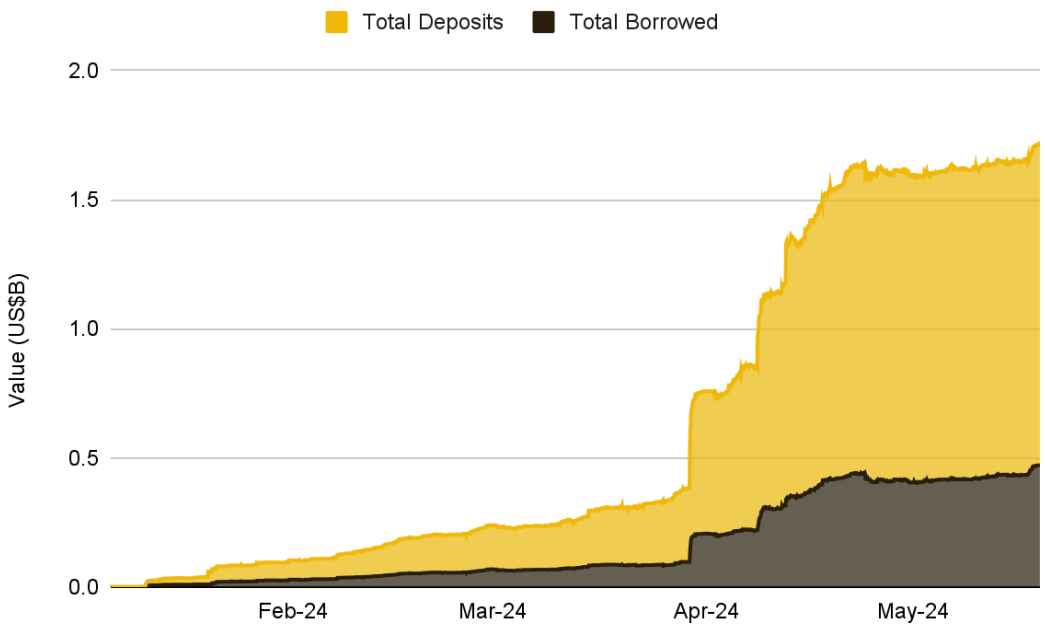
By leveraging their flexible design, modular lending protocols aim to become base layer primitives that enable the creation of more user-focused lending products.

Morpho

Morpho is leading the charge in the shift towards modular lending. **With over US$2.5B in TVL, Morpho has become the 6th largest on-chain lending platform, boasting an impressive 76.7% increase YTD**. This growth can largely be attributed to the introduction of new products, Morpho Blue and MetaMorpho, launched in January this year.

In a matter of months, Morpho Blue has garnered over US$1.2B in deposits, of which nearly US$500M are outstanding loans. This underscores just how highly money markets are valuing this new type of primitive. As one of the first modular lending protocols, several notable projects are already integrating Morpho pools into their offerings.

Figure 18: In just a few months, Morpho Blue has attracted over US$1.2B in deposits, of which nearly US$500M are outstanding loans



Source: Dune Analytics (@morpho), Binance Research, as of May 20, 2024

Before delving deeper into Morpho Blue and MetaMorpho, it's important to understand that Morpho has two distinct product iterations. While the focus will be on the recent modular lending products, Morpho initially launched with Morpho Optimizer, a yield optimizer built on top of established lending pools like Aave and Compound.

- **Morpho Optimizers**: The initial version of the Morpho Protocol, known as Morpho Optimizers, was designed to **enhance lending and borrowing rates through a P2P matching algorithm**. This algorithm maintained the same liquidity and risk parameters as the underlying lending pools.

- **Morpho Blue**: Morpho Blue represents the latest iteration of the protocol. It is a **lending primitive layer** that **enables the creation of immutable and efficient lending markets in a permissionless manner**.
    - **MetaMorpho**: MetaMorpho is an open-source protocol designed for **permissionless risk curation on top of Morpho Blue**.

Morpho Blue: Permissionless Market Creation

Morpho Blue is a trustless and efficient lending primitive that allows the permissionless creation of isolated lending markets. Isolated lending markets refer to a market between just two assets - one collateral and one borrowable asset, each with independent risk management. **The key advantage of Morpho Blue is that it allows users to seamlessly deploy isolated lending markets.** Users can directly set lending parameters such as the loan asset, collateral asset, oracle, liquidation loan-to-value ("LLTV"), and interest rate model ("IRM"). Each parameter is selected at the market's creation and remains immutable, providing a level of flexibility not seen in traditional on-chain lending.

Importantly, **Morpho allows for the independent creation of fixed-parameter markets without the need for extensive governance oversight**. Only the LLTV and IRM must be selected from a limited set of options approved by Morpho Governance. This marks a departure from existing lending protocols like Aave and Compound, which instead require governance approval for asset listings and parameter changes. These protocols also pool assets into a single lending pool, thereby sharing risk. Let's explore in further detail on how Morpho Blue differentiates itself from traditional lending markets.

- **Liquidation Mechanism**: Like all lending protocols, Morpho has a liquidation mechanism to mitigate default risk and protect lenders' capital[28]. When an account's LTV ratio exceeds the market's LLTV, the account's position can be liquidated. On Morpho Blue, anyone can perform this liquidation by repaying the account's debt in return for the equivalent amount in collateral, plus an incentive.

  The interesting point is how Morpho accounts for and realizes bad debt[29]. In traditional lending pool designs, accrued bad debt remains in the market indefinitely until manual intervention is required to pay it down. Morpho, however, handles this differently by **proportionally sharing losses** among all lenders in the pool. This **immediate loss realization** helps prevent liquidity runs that have plagued other lending pools.

- **Oracle-Agnostic Pricing**: Effective lending protocols require accurate market pricing for collateral and lent assets to manage liquidations and borrowing capacities. Many protocols depend on specific oracle services like Chainlink, but they are constrained by the assets and prices available through their chosen oracle, limiting their asset listing process. Conversely, some protocols adopt an oracle-less approach, relying on internal trading markets. This method introduces its own complexities, such as increasing gas consumption and impacting auditability.

Morpho Blue, however, is **oracle-agnostic**[30]. This means that **Morpho has no single oracle or trading mechanism built into it**, allowing for greater flexibility. This approach **enables support for a wider variety of assets from the outset**, enhancing Morpho's permissionless lending capabilities.

- **Interest Rate Model ("IRM")**: IRMs play an important role for lending protocols as they define the interest borrowers pay in a given market. **Morpho Blue is an IRM agnostic protocol, supporting any IRM for its markets based on a governance approved set of models**[31]. Currently, this set only includes a single model in **AdaptiveCurveIRM**, which aims to maintain a target utilization ratio of 90% by adjusting the interest rate curve in response to market dynamics.

- **Incentives**: Unlike traditional lending pools, **Morpho Blue allows for targeted incentives.** Projects can incentivize specific asset pairs to drive adoption of their tokens. The **Universal Rewards Distributor ("URD")** powers this mechanism, enabling the distribution of multiple ERC20 tokens via a gas-optimized, off-chain computed Merkle tree[32].

- **Singleton Contract**: **Morpho Blue operates as a singleton contract**, meaning all markets exist within a single smart contract. This **simplifies user interactions across markets** and **reduces gas consumption** compared to other platforms[33].

- **Callbacks**: **Callbacks enable developers to execute custom logic during the transaction process on Morpho Blue.** This is particularly useful for more sophisticated users, who can perform advanced operations without needing to deal with repetitive back-and-forth actions.

- **Flash Loans**: Flash loans are loans that can be taken without any collateral if the borrowed assets are repaid in the same transaction. **Morpho Blue offers free flash loans, allowing users to borrow from all markets simultaneously,** thanks to its singleton contract. This facilitates easier liquidations, collateral swaps, and on-chain arbitrage opportunities.

- **Account Management**: **Morpho Blue's authorization system lets users grant permissions to other addresses to borrow and withdraw on their behalf**. This system is especially useful in the bundling of transactions for externally owned accounts ("EOAs") and in the implementation of customized management systems.

- **Externalized Risk Management**: Traditional protocols rely on native token holders for governance and risk management, which may not always represent users' best interests. **Morpho Blue separates risk management from the protocol**, allowing users the discretion of creating markets with any asset and risk parameter. This **minimizes governance involvement** and **supports a broader range of risk appetites and use cases**[34].

  While this approach provides advanced lenders with greater flexibility, it can be complex for average users who are typically accustomed to having risk management

handled for them. Fortunately, Morpho Blue is designed so that additional layers can be built on top to address such constraints.

MetaMorpho: Permissionless Lending Vaults

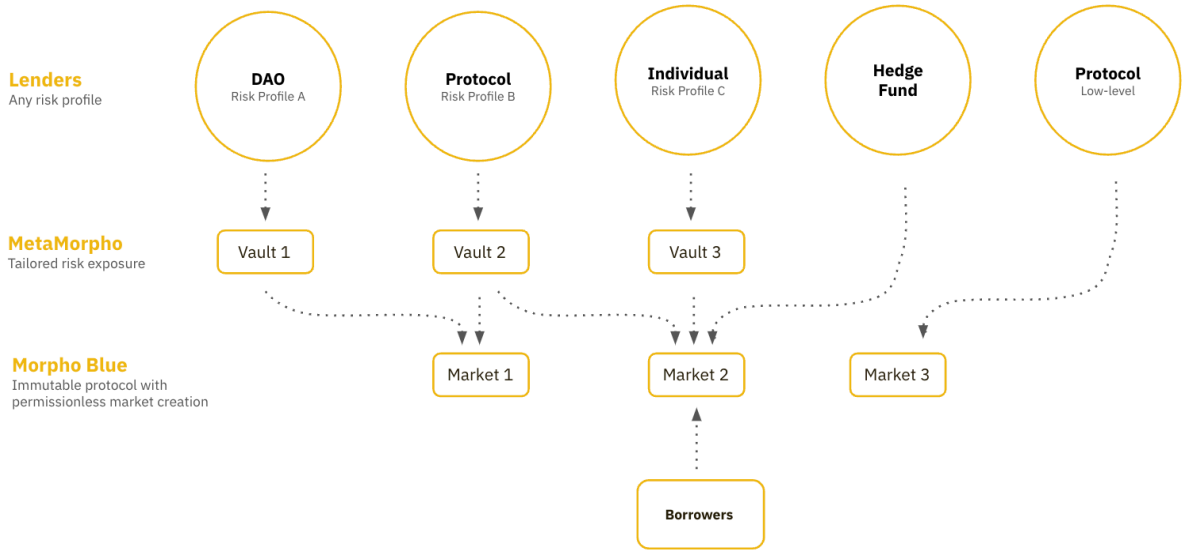
Given the complexities associated with Morpho Blue, **MetaMorpho was developed to offer a better experience for end-users**[35], particularly passive lenders. Managing risk across Morpho Blue markets involves multiple factors, such as collateral assets, liquidation LTV, oracles, IRMs, making it more complex than traditional platforms like Aave and Compound, where governance makes these decisions on behalf of users.

MetaMorpho is a permissionless risk management protocol designed to facilitate the creation of lending vaults on top of Morpho Blue markets. A MetaMorpho vault supplies liquidity to Morpho Blue markets, allowing users to **delegate risk management** to the vault. This delegation automates decisions, offering a more passive experience similar to traditional lending platforms. Let's explore the key components of MetaMorpho's design[36].

- **Risk Curation**: **Each MetaMorpho vault can be tailored to reflect different risk profiles based on the vault's goals and value proposition, enabling users to choose their personalized risk exposure**. This approach addresses a significant limitation of multi-asset lending pools, where all users are forced into a one-size-fits-all risk profile, regardless of their risk tolerance.

  For instance, a risk-averse lender can avoid certain asset exposure by depositing in a vault that aligns with their preferred balance between risk and return, reflecting their individual risk appetite. This level of customization is not available on traditional lending platforms, which expose users to all assets listed in the pool.

Figure 19: Morpho's architecture enables greater flexibility than traditional lending pool models, as it can scale to any number of vaults, markets, and risk profiles



Source: Morpho Documentations, Binance Research

- **Timelock Mechanism**: A timelock mechanism introduces a delay before certain actions can be executed, adding a layer of security. **This feature allows users of a MetaMorpho vault time to review and respond to proposed changes, preserving the noncustodial nature of MetaMorpho vaults**. It ensures that users maintain control of their assets and can withdraw them at any time if needed.

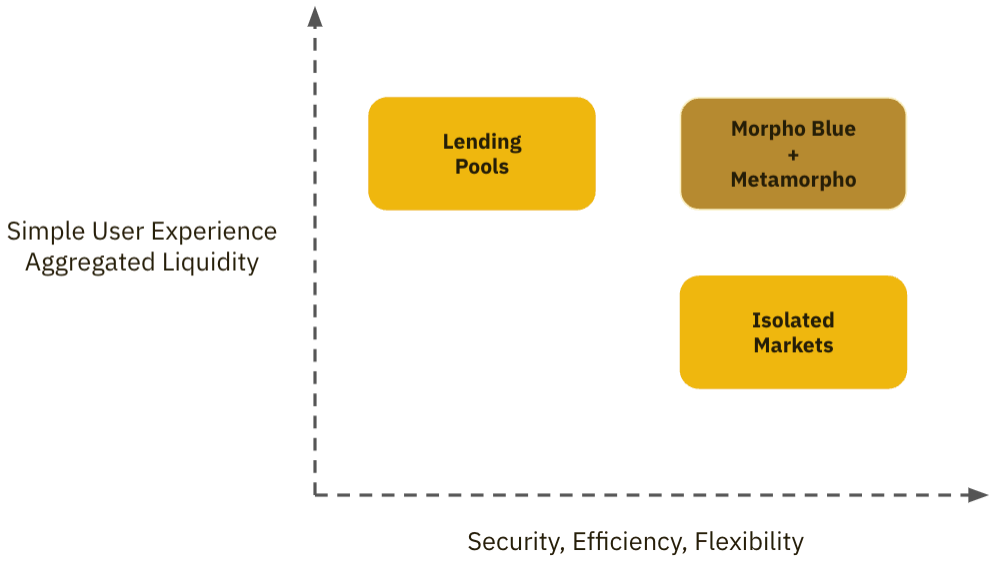
- **Amplified Liquidity for Lenders**: MetaMorpho vaults can aggregate and amplify withdrawable liquidity, providing lenders with a better liquidity profile than multi-asset lending pools. Lending to isolated markets via a MetaMorpho vault avoids the liquidity fragmentation seen in other isolated lending markets. **Liquidity from each market is aggregated at the vault level, giving users the same withdrawal liquidity as a multi-asset lending pool, while the underlying markets remain isolated**[37].

  This aggregation occurs because liquidity from each vault on Morpho Blue is shared by anyone lending to the same markets. This **'liquidity amplification' effect grows with the number of vaults**, leading to greater liquidity, efficiency, and scalability.

Modular Lending Market Footing

Combining the two together, **Morpho Blue and MetaMorpho comprise Morpho's unique and modular approach to on-chain lending**. They represent new primitives in DeFi lending, **merging the benefits of isolated markets with those of multi-asset lending pools**. At the base layer, Morpho Blue offers efficient, secure, and flexible isolated markets. Built on top of this, MetaMorpho vaults serve as an abstraction and aggregation layer, simplifying the lending user experience and aggregating liquidity.

Figure 20: Morpho Blue and MetaMorpho combine the simple user experience and aggregated liquidity of lending pools with the efficiency and flexibility of isolated markets

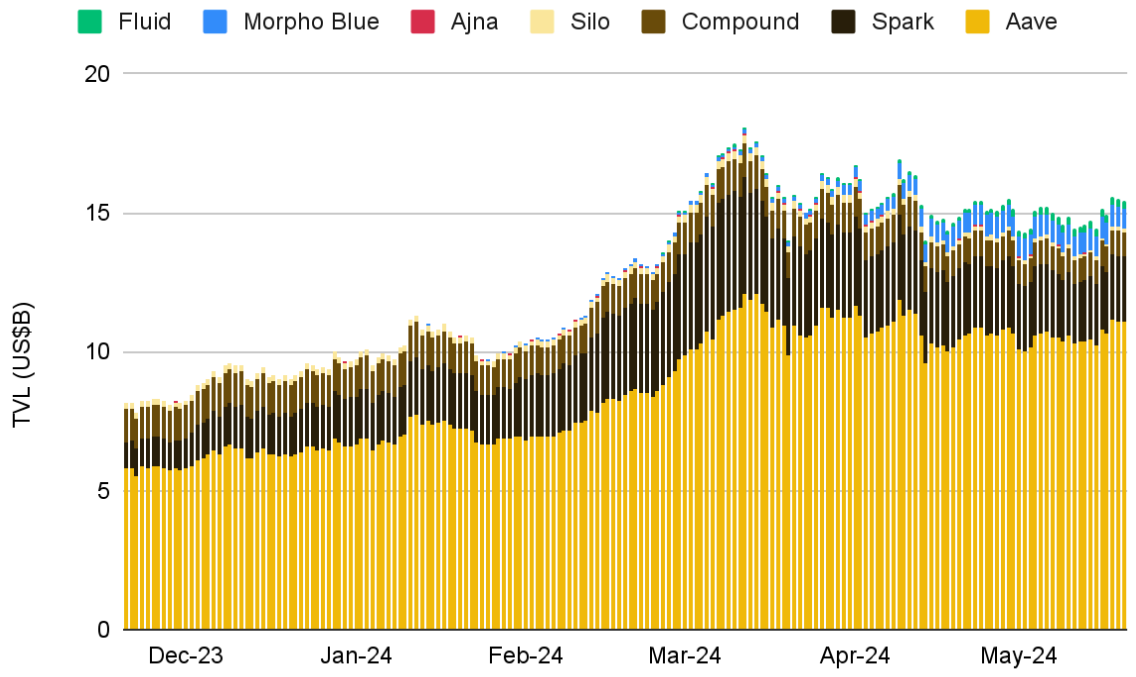


Source: Morpho Documentations, Binance Research

Morpho's modular design clearly offers significant benefits in terms of flexibility and capital efficiency. However, we are yet to see liquidity growth and utilization in these protocols significantly outperform traditional multi-asset lending pools. While lending platforms like Aave remain dominant, Morpho's unique approach should position it well to capture user interest and liquidity. Maintaining its growth momentum will be crucial as competition is expected to intensify with the continued market upswing. Though, in the short term, the primary competition for Morpho may not be with the larger traditional players.

Other modular lending products, like Silo and Ajna, are also active in the market but have experienced limited growth compared to Morpho. Morpho is likely to establish its footing by first competing with these other modular lending products before aiming to surpass the traditional lending platforms. It will be interesting to observe which modular lending protocols will be able to attract liquidity and user demand in the interim. Mechanism design, business development initiatives and token incentives will all play a key part here.

Figure 21: Although Morpho's growth outpaces other modular lending protocols, it still has ground to cover compared to major players like Aave, Compound, and Spark



Source: DefiLlama, Binance Research, as of May 20, 2024

6 Prediction Market

Prediction markets are a type of derivatives market where users can trade and speculate on the outcome of future events. Despite being an interesting concept, they have not garnered the attention they deserve, primarily because these markets have not attracted the same level of capital or volume as some of the other markets discussed in this report. This is partly due to impending regulatory hurdles and the fact that many incumbent projects have yet to find their footing and achieve the right product-market fit.

Nevertheless, prediction markets have long been touted as a groundbreaking on-chain use case[38]. Given the enormous size of betting markets alone, it's no surprise there is optimism about protocols that enable speculation across a wide range of categories through decentralized prediction markets. Since the start of 2024, these markets have gained momentum, reaching new all time highs across several metrics, suggesting we may finally be witnessing a shift this cycle.

Figure 22: Prediction markets have reached a record high of US$55.1M in TVL, following a 57.7% increase YTD

Source: DefiLlama, Binance Research, as of May 20, 2024

The **occurrence of events is a significant demand driver** for prediction markets, as these events create opportunities for speculation. Prediction contracts can be created for virtually anything, allowing users to build portfolios on some of the world's most contentious topics and earn returns if they are correct. Hence, the increased frequency of

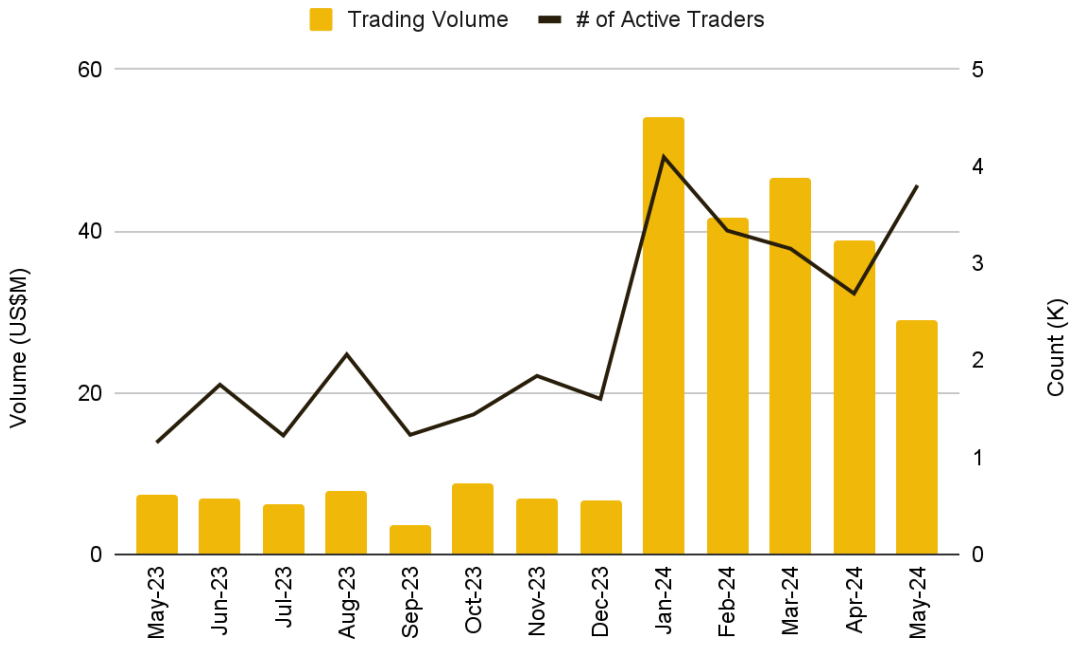
major events is likely to catalyze the growth of prediction markets. **This year, eight of the ten most populous nations in the world are holding elections**[39], including the highly anticipated U.S. Presidential election, which is driving substantial speculative interest.

Moreover, prediction markets operate on the **wisdom of crowds** principle[40], adding another layer to their value proposition. They can **aggregate predictions from a broad user base** and **financially incentivize the reduction of information asymmetry**. Assuming efficient markets, the collective effect of thousands to millions of people using their informational advantages to place bets on the probability of an outcome theoretically means that odds in prediction markets tend to converge with actual events. Thus, prediction markets have the potential to be an **efficient subset of curation markets, offering insights into collective expectations about future occurrences**. With adequate volume, prediction markets enhance data quality, news accuracy, and public discourse by gamifying truth.

Polymarket

Built on Polygon, **Polymarket** **is currently the leading on-chain prediction market**. Given the modest resurgence of prediction markets this year, it is no surprise that Polymarket has been a major contributor to the recent growth. This is evident from the significant uptick in Polymarket's trading activity, which has averaged over US$42M per month since the beginning of the year. Testament to their growth, Polymarket recently closed a Series B funding round of US$45M, with notable investors such as Peter Thiel's Founders Fund and Vitalik Buterin, bringing their total funding to US$70M[41].

Figure 23: Polymarket has experienced a significant resurgence in activity, with average monthly volumes increasing from US$6.1M in 2023 to US$42.0M in 2024

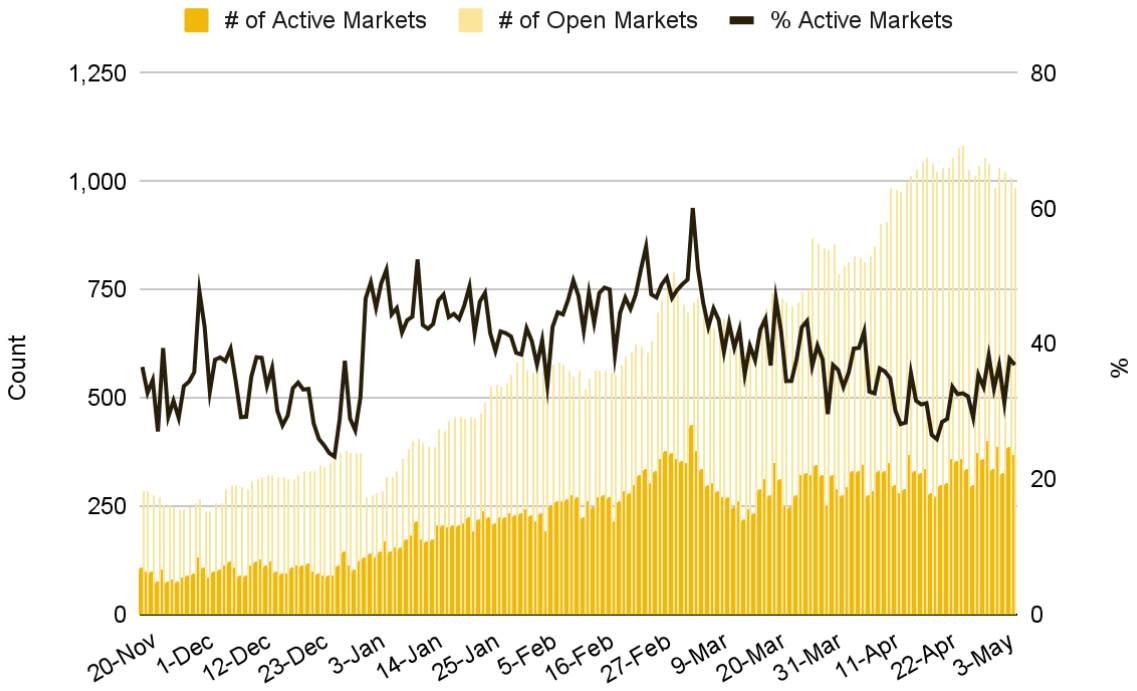


Source: Dune Analytics (@rchen8), Binance Research, as of May 20, 2024

This sustained increase in volumes over several months indicates that the growth may not be merely temporary. Polymarket's active user base has also seen substantial growth, with a larger number of traders engaging with the platform. **The monthly active trader count has risen to 3.8K, up from 1.6K at the end of 2023, showcasing Polymarket's increasing user engagement**.

Polymarket's claim to being the leading prediction market is not just based on the capital flowing through its platform but also on the **extensive range of markets it covers**. Users can speculate on future events across various highly-debated topics, including sports, politics, and pop culture. This growth in engagement is further reflected by an increase in the number of open markets, with the **percentage of active markets rising from 0.32% to 0.37% this year**.

Figure 24: The number of open and active markets on Polymarket is on an upwards trajectory



Source: Flipside (@ario), Binance Research, as of May 20, 2024

With the current market upswing bringing in more users and liquidity, this creates a strong foundation of growth, especially as major events edge closer. **Polymarket has historically done well in generating traction from political events**, accumulating well over US$50M in volumes from markets based on the previous U.S. election[42]. With over US$128M already bet on the upcoming election, Polymarket is well-positioned to capitalize on this once again as the election draws nearer later this year.

How Polymarket Democratizes Predictions

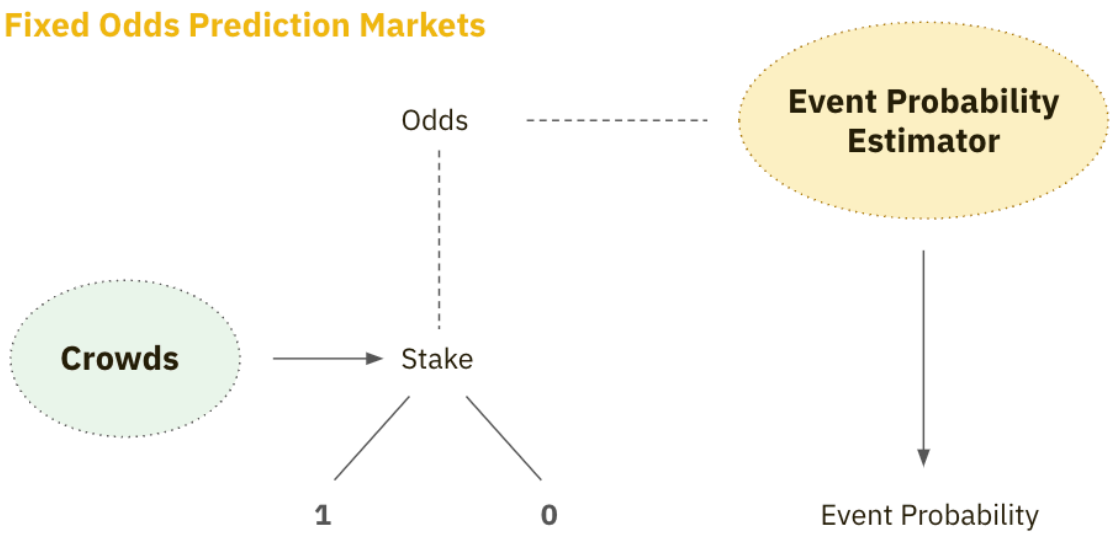
Polymarket offers a versatile platform where users can trade on the outcome of events, create new events, provide liquidity, or participate in event outcome reporting. It leads the prediction market space due to its continuous UX improvements and expansion of event categories. However, as the space grows competitive, the focus will likely extend beyond UX improvements to include underlying design mechanisms, liquidity and incentives. Let's delve into the specifics behind Polymarket.

- **Binary Markets**: **Polymarket operates on binary events**[43], such as a coin flip, where the outcome can only be 'Yes' or 'No'. Outcomes are **tokenized on the Polygon network** and **represented using Gnosis' Conditional Token Framework**.

  The odds of an event occurring are represented by values ranging from US$0 to US$1, correlating to the perceived probability of the event. This makes it a zero-sum game: as the price of the 'Yes' share increases, the price of the 'No' share decreases. Market participants buy and sell these shares, causing the prices to adjust based on collective beliefs. Each contract has an expiry date, and upon expiration, holders of winning shares receive US$1, while losers receive nothing.

  For example, if an event has a 90% chance of occurring, the price of a 'Yes' share on Polymarket would be US$0.90, while a 'No' share would be US$0.10. If the 'Yes' outcome holds true, a user profits $0.10 per share.

Figure 25: Polymarket predictions take the shape of binary options, where the outcome is either 1 or 0



Source: Polymarket Documentations, Binance Research

- **Central Limit Order Book ("CLOB")**: **Polymarket uses a CLOB model, where an operator manages off-chain matching, ordering, and execution, with settlements occurring on-chain**[44]. Once orders are matched by the respective market maker and taker, the operator is responsible for submitting trades to the

underlying blockchain network. This hybrid-decentralized approach is similar to mechanisms in many on-chain derivatives projects.

All trading directions in the underlying binary markets are supported by orders on a single, unified order book, meaning liquidity is shared between complementary binary outcome tokens. Polymarket's custom exchange contract ("CTFExchange"), which has been audited, supports this unified book structure and the matching service calculates matches accordingly.

To enhance liquidity and user experience, Polymarket transitioned from an AMM model to CLOB in late 2022. This shift was driven by the high risk of impermanent loss in binary markets, which required very active and informed management of positions. The CLOB model allows market makers to provide liquidity more efficiently, reducing their risk and capital costs, and improving the trading experience through decreased price impact. Higher liquidity, in turn, leads to an increase in the total number of markets available.

- **Market Resolution**: For a prediction market to be effective, it needs a mechanism to accurately determine which of the traded outcomes was correct. **Decentralized prediction markets depend on oracles for reliable market resolution**. Oracles transmit real-world data into smart contracts, providing information on anything from asset prices to event outcomes. Most outcomes on Polymarket are resolved via **UMA's Optimistic Oracle V3**[45].

- **Market Maker Rewards**: Polymarket has a liquidity incentive program that rewards market makers who place limit orders on its markets[46]. The reward amount depends on how helpful these orders have been in filling markets. These rewards aim to accelerate the adoption and usage of its CLOB, and induce a strong network effect. The goal is to create a healthy and liquid prediction marketplace. This program's methodology is heavily inspired by dYdX's LP rewards.

The Path Ahead

- **Importance of Liquidity**: **Prediction markets need sufficient liquidity to allow users to place trades efficiently without drastically skewing the odds**. However, they have at times struggled to access large and consistent liquidity sources. **Most liquidity tends to concentrate around a handful of very popular prediction categories**, leaving smaller, niche markets without adequate liquidity. This not only impacts the adoption and trading activity of these markets but also their ability to function as accurate information markets.

  Additionally, LPs have typically faced the risk of impermanent loss due to the nature of binary markets, where the proportions of tokens in liquidity pools change drastically as prices converge towards the correct outcome. Simply put, LPs may end up with a large number of tokens from the outcomes that converge to a price of

zero. This risk necessitates active management of positions, meaning LPs in this market are likely to be dominated by a handful of sophisticated actors.

Therefore, it's no surprise that liquidity has been a major focus of Polymarket's strategy. Whether through pivoting to a CLOB model, running liquidity incentive programs, or bootstrapping liquidity themselves, Polymarket has prioritized enhancing liquidity for its markets. Ultimately, the future success of prediction market protocols will hinge on their ability to effectively concentrate liquidity.

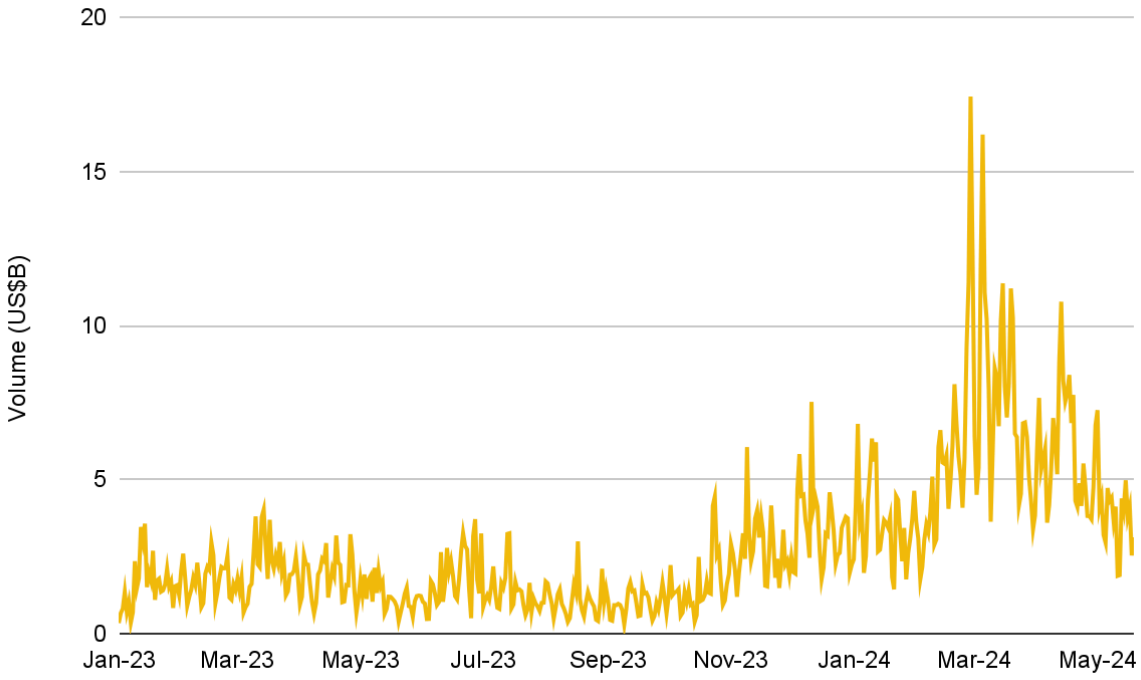
- **Role of Artificial Intelligence ("AI")**: Given that prediction markets have yet to scale as other DeFi markets, it may require them to adopt something new. This could come via the adoption of AI participants[47]. AI could play a crucial role by generating content, recommending events, allocating liquidity, and aggregating information. Vitalik Buterin does a good job at detailing this in a recent blog post.

7 Derivatives Market

Derivatives represent one of the largest markets in TradFi, and the crypto industry has mirrored this trend, with derivatives products dominating trading volumes on CEXes. Despite the strong presence of derivatives in CEXes, a substantial addressable market remains for DeFi to capture.

Since the beginning of this year, there has been a notable acceleration in on-chain derivatives adoption, with average daily volumes rising from US$1.8B last year to US$5.4B this year. This growth has been driven by **increasing competition from newer entrants** such as Hyperliquid, Aevo, and RabbitX, as well as a **resurgence in volume for established players** like dYdX and GMX. Additionally, the **growth of blue-chip derivatives projects on non-EVM blockchains** highlights the sector's considerable progress.

Figure 26: A significant resurgence in on-chain derivatives activity has propelled average daily volumes from US$1.8B last year to US$5.4B this year



Source: Artemis, Binance Research, as of May 20, 2024

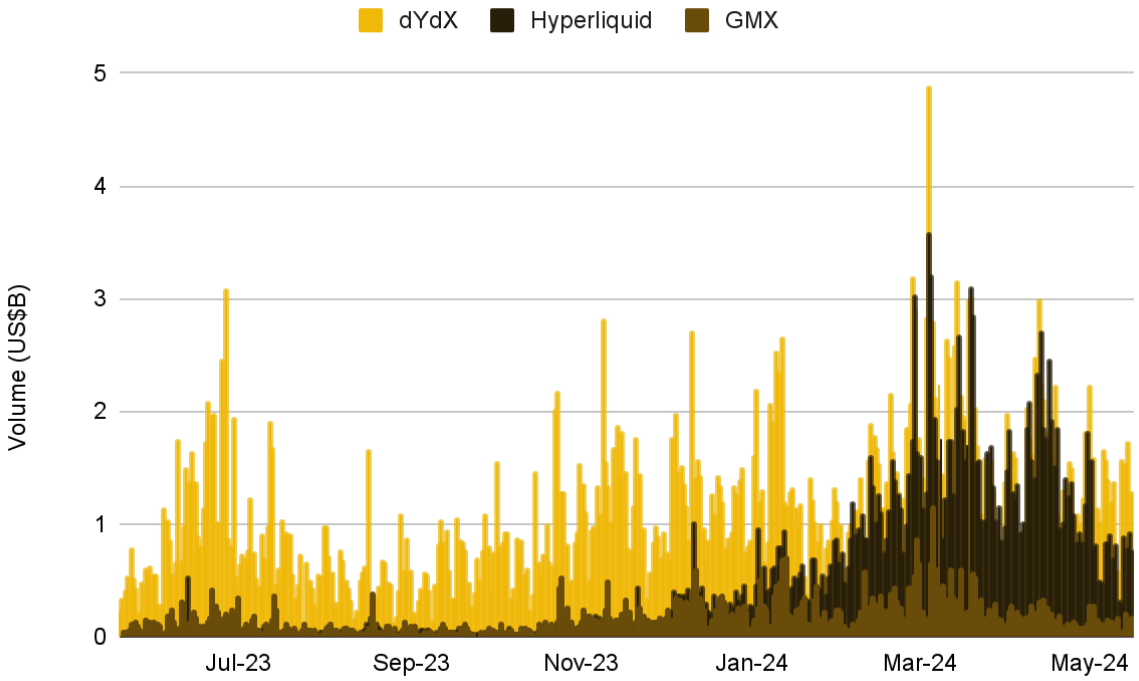
This trend is expected to persist, fueled by the fundamental need for more sophisticated trading strategies within DeFi. Currently, **DEXes account for less than 5% of crypto market volumes**, primarily due to the ease of onboarding, cheaper fees, and superior user experience offered by CEXes. Though, we seem to be at a critical juncture, leaving a huge opportunity for on-chain derivatives, with perpetual DEXes in particular being the first to lead the shit.

For further details on derivatives, refer to our extensive coverage in the previous report, Navigating DeFi Derivatives.

Hyperliquid

Hyperliquid is a **Layer 1 ("L1") order book-based perpetual futures derivatives DEX**, launched in 2023 by founders with experience in high-frequency trading ("HFT") companies such as Citadel and Hudson River Trading. The protocol gained significant prominence due to its **ability to perform on par with CEXes,** offering **competitive fees** while **operating fully on-chain**[48]. With daily volumes now exceeding US$1B, Hyperliquid has emerged as one of the leading players in the on-chain derivatives space, often surpassing long-standing competitors like GMX and closely trailing dYdX.

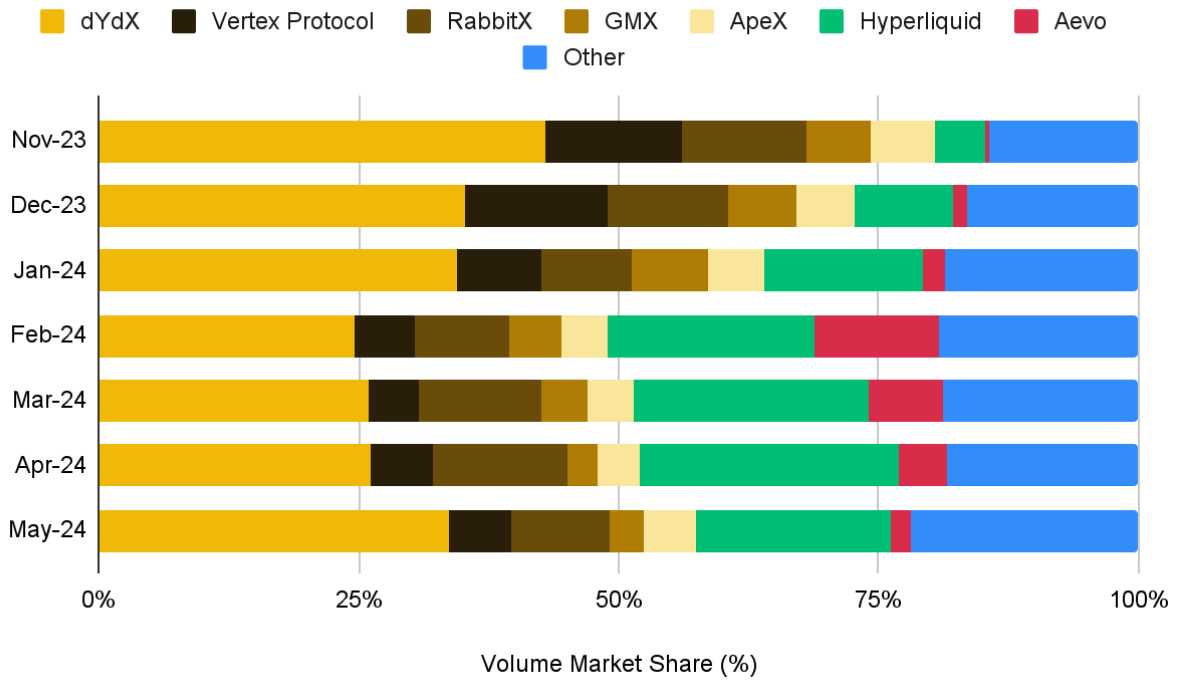
Figure 27: Since the beginning of 2024, Hyperliquid has consistently recorded impressive daily volumes exceeding US$1B



Source: Artemis, Binance Research, as of May 20, 2024

Hyperliquid's growth trajectory is partly attributed to the **absence of a native token** to date. Since opening up points to a broader user base in late 2023, there has been a notable increase in usage across all metrics on the exchange[49]. The project is currently **fully self-funded**, with **no token incentives** in place, unlike other competing DEXes, which arguably makes certain areas of its growth even more impressive. This volume growth has been accompanied by an upward trend in market share, with Hyperliquid now capturing 18.9%, showcasing its outperformance relative to the broader market.

Figure 28: In just six months, Hyperliquid's market share has grown from 4.8% to 18.9%, making it the second largest by trading volume, trailing only dYdX



Source: Artemis, Binance Research, as of May 20, 2024

Trader-first Approach to On-chain Perps

Hyperliquid has so far been able to maintain and organically grow volume. Central to its strategy is a **product designed with the trader as its main focus**. This emphasis has shaped various design components, resulting in a highly performant, purely on-chain perpetual DEX that offers CEX-like trading experiences.

- **Hyperliquid L1**: **Hyperliquid operates its own L1 blockchain**, specifically designed for perpetual futures trading[50]. This L1 is built from the ground up and does not rely on external frameworks like the Cosmos SDK. It is secured by a proof of stake ("PoS") mechanism, with more details on staking and slashing to be released upon the launch of its native token. Notably, the L1 can handle 20K operations per second with sub-second block latency. **In contrast to other performant DEXes like dYdX, which use a hybrid on- and off-chain approach, Hyperliquid is able to achieve high performance entirely on-chain**.

  To further push the boundaries of its network bandwidth, the Hyperliquid L1 will be **transitioning from Tendermint to its custom consensus mechanism, HyperBFT**, in the coming weeks[51]. HyperBFT is envisioned to **support up to 100x the throughput**, though in practice, **state machine execution is likely to become a bottleneck at around 200K operations per second**. This is because, like all other L1s, Hyperliquid is subject to state growth, which typically impacts speed and

network costs. However, unlike general-purpose L1s, the Hyperliquid L1 is designed purely to function as a perpetual futures DEX, meaning its state can be more efficiently represented.

Hyperliquid has also opted to build its **L1 attached to Arbitrum**, with a bridge secured by the L1 validator set. This facilitates connections and fund deposits to the L1 via Arbitrum, chosen for its **deep liquidity**, **easy on-ramps**, **low transaction costs**, and **production readiness**. This approach mitigates the difficulty of bootstrapping assets to a new chain.

Despite its innovative design, there are risks associated with the Hyperliquid L1. It has **not undergone as extensive testing and scrutiny as established L1s** like Ethereum. Its reliance on the correctness and security of the Arbitrum bridge and price oracles maintained by validators introduces **smart contract and oracle manipulation risks**. Prioritizing the development and scaling of the DEX over decentralizing the L1 has also resulted in a **limited and non-permissionless validator set**. How Hyperliquid progresses on decentralizing its validator set will be an interesting point to monitor going forward.

- **On-chain Order Book**: Hyperliquid operates a fully on-chain order book that functions similarly to those on CEXes. A key distinction is its trader-first approach, **optimizing for trade matching rather than volume**. This **minimizes toxic order flows**, which typically impact liquidity and spreads due to trades from HFT participants. Hyperliquid accomplishes this by **ordering transactions**, **prioritizing the execution of cancel orders and post-only orders**[52]. While this reduces volumes between HFT makers and takers, it ensures **better execution rates for end users**.

- **Vaults**: A common challenge for on-chain derivatives is bootstrapping initial liquidity. Hyperliquid addresses this with its vaults, which have aided the protocol to attract one of the largest TVL figures across derivatives protocols, currently at US$356.6M[53]. **Vaults allow users to deposit funds and passively earn yield while employing various trading, liquidation, and market-making strategies**[54]**.**

  The main protocol vault, called the **Hyperliquidity Provider ("HLP")**, is particularly attractive because a portion of net fees is directed to the HLP, with the remaining fees going toward an insurance fund to backstop LPs in case of bad debt. Though, this structure may evolve as Hyperliquid shifts its focus from rapid adoption to growing earnings and following the launch of its native token. Hyperliquid also enables **permissionless vault creation**, giving rise to **community-maintained user vaults**. Owners of these vaults receive a 10% profit share for managing the vault.

  Moreover, these vaults **democratize strategies typically reserved for privileged parties** on other exchanges, making them **accessible to a wider user base**. While blue-chip pairs like ETH or BTC quickly attract liquidity, longer-tail markets often do not. Here, the passive liquidity provided by protocol vaults like HLP allows

Hyperliquid to offer liquidity to newer markets swiftly. This **capability to quickly introduce high-demand products gives Hyperliquid a competitive edge** over other DEXes.

- **Exotic Pairs**: Hyperliquid supports a **wide range of markets**, including long-tail assets, far exceeding the offerings of competitors like GMX and dYdX. It also supports **advanced order types** such as Limit, Scale, and TWAP. But perhaps the more interesting element is **Hyperliquid's support of exotic pairs through index perpetual contracts**[55]. These contracts track a formula instead of a spot asset price as the underlying index. Two notable examples are **NFTI-USD**, which allows traders to bet on an index of the floor prices of major NFT collections, and **FRIEND-USD**, which allows traders to bet on an index of the prices of keys for top friend.tech accounts.

While Hyperliquid's flagship product remains its on-chain perpetual futures DEX, the team has announced plans for future developments including a native token standard, spot trading, and permissionless liquidity. These reflect Hyperliquid's commitment to expanding their offerings and maintaining a competitive edge in the market. A recent example of this strategy is the introduction of pre-market offerings. Read more about Hyperliquid Improvement Proposals ("HIPs") here.

The Case for Pre-Market Offerings

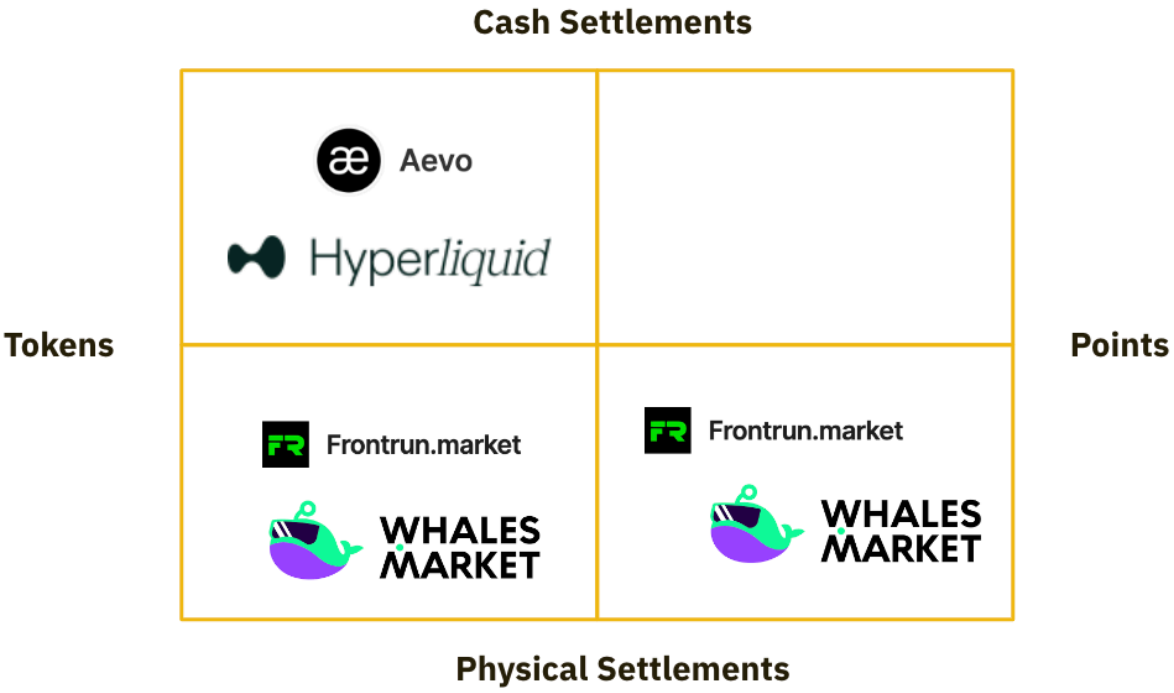
The start of the new cycle has seen a surge in airdrop campaigns over the past few months, attracting significant attention and liquidity. Until recently, traders had to wait until the official Token Generation Event ("TGE") to begin trading these tokens. Some even resorted to prediction markets like Polymarket to bet on the timing of the TGE. **This behavior highlighted a key market insight: traders are eager to trade tokens before their official launch**. To meet this demand and capture value from this previously under-served market, Hyperliquid introduced Hyperps[56].

- **Hyperps**: **Hyperps is a pre-token offering product**, in other words, a perpetual futures product for unlisted tokens. **They trade like standard perpetual derivatives but don't rely on any external data**, eliminating the need for an underlying spot or index oracle price. Instead, Hyperps **balances long and short demand using funding rates computed against its own moving average price** rather than an external spot price. This price is calculated using an 8-hour exponentially weighted moving average of the preceding day's minutely mark prices.

Pre-market offerings are not unique to Hyperliquid, as other protocols like Aevo also allow users to trade tokens before their official launch. The other way to speculate in the pre-market has been trading points issued by projects, as seen with Whales Market and Front Run. However, **points come with an information gap**, as there is **no direct or guaranteed relationship between points and token conversion**. Despite this, these protocols have found a way to **create new markets** and **facilitate price discovery** before

tokens are formally launched. As trading features like high leverage and low spreads become more commoditized, DEXes offering innovative products like pre-market offerings will be better positioned to differentiate themselves.

Figure 29: Market landscape of decentralized pre-market offerings



Source: Project Documentations, Binance Research

However, **pre-market offerings often suffer from illiquidity and price divergence across DEXes**, making it challenging for traders to leverage these tools effectively. Several risks, including **information asymmetry** and **price volatility**, come into play. Consequently, certain factors will likely determine where demand ultimately accrues in this new market.

- **Deep Liquidity**: Protocols that can attract more traders and deepen their pre-market liquidity will have a competitive edge, as **sufficient volumes are essential for efficient price discovery**. Without adequate liquidity, price discovery becomes highly inefficient.
- **Token Support** : The primary advantage of pre-launch markets is their ability to provide access to exclusive tokens not available elsewhere. With more token launches anticipated, **protocols that support a unique and diverse range of pre-market tokens will be able to carve out a niche** and capitalize on this demand. Additionally, the hype and marketing surrounding a particular project will likely influence the amount of liquidity that accrues to the DEX.

While this is still an unpredictable market, it holds promise as a potential **barometer for initial market reactions and investor sentiment** on newly launched projects[57]. A key metric to track will be the accuracy of pre-market prices compared to post-market pricing. This accuracy depends on the liquidity, price discovery, and overall maturity of pre-market

offering products. Once fully developed, these offerings could become a valuable DeFi primitive, unlocking new insights and trading strategies for investors. This presents an opportunity for a market leader in pre-market offerings to emerge - one that can efficiently aggregate the demand and supply for pre-market tokens.

8 Closing Thoughts

DeFi is at an interesting inflection point. The sector is gaining momentum across both major and niche markets, driven by a plethora of new developments and narratives. This growth, particularly among protocols that are making previously inaccessible financial primitives available on-chain, builds on the groundwork laid by early sub-sectors like DEXes, enabling DeFi to evolve and embrace new types of markets and primitives.

The significance of these emerging markets has become increasingly clear as the push for an expanded on-chain presence intensifies. Recent market uptrends have revitalized on-chain activity, and developments such as spot ETF approvals and asset tokenization are attracting a surge of institutional liquidity and participation. This highlights the importance of equipping the DeFi ecosystem with tools that meet diverse market demands and ensure the retention of new demand and liquidity on-chain.

As a result, the emergence of differentiated markets that include new types of derivatives, innovative on-chain yield paradigms, CEX-like trading products, and more capital-efficient lending designs, are positive developments. These innovations not only enhance efficiency within decentralized markets but also bridge the gap between DeFi and TradFi.

Despite this optimistic outlook, there are still challenges to overcome in each market's trajectory. Issues like liquidity fragmentation, composability, and user experience continue to impede adoption en masse. Furthermore, the introduction of new technologies brings its own set of inherent risks.

As these markets mature, we anticipate a shift towards a more consolidated market structure, coalescing around a few dominant approaches. In the coming year, DeFi will likely continue to reinvent itself, evolving to such an extent that it will become unrecognizable from its early iterations. The rapid pace of innovation suggests that we will soon be discussing the next generation of financial primitives. Exciting times are indeed ahead, and it will be compelling to observe which markets and protocols rise to the occasion in the long-term.

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