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Overview of Decentralised Derivatives

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Research and Insights

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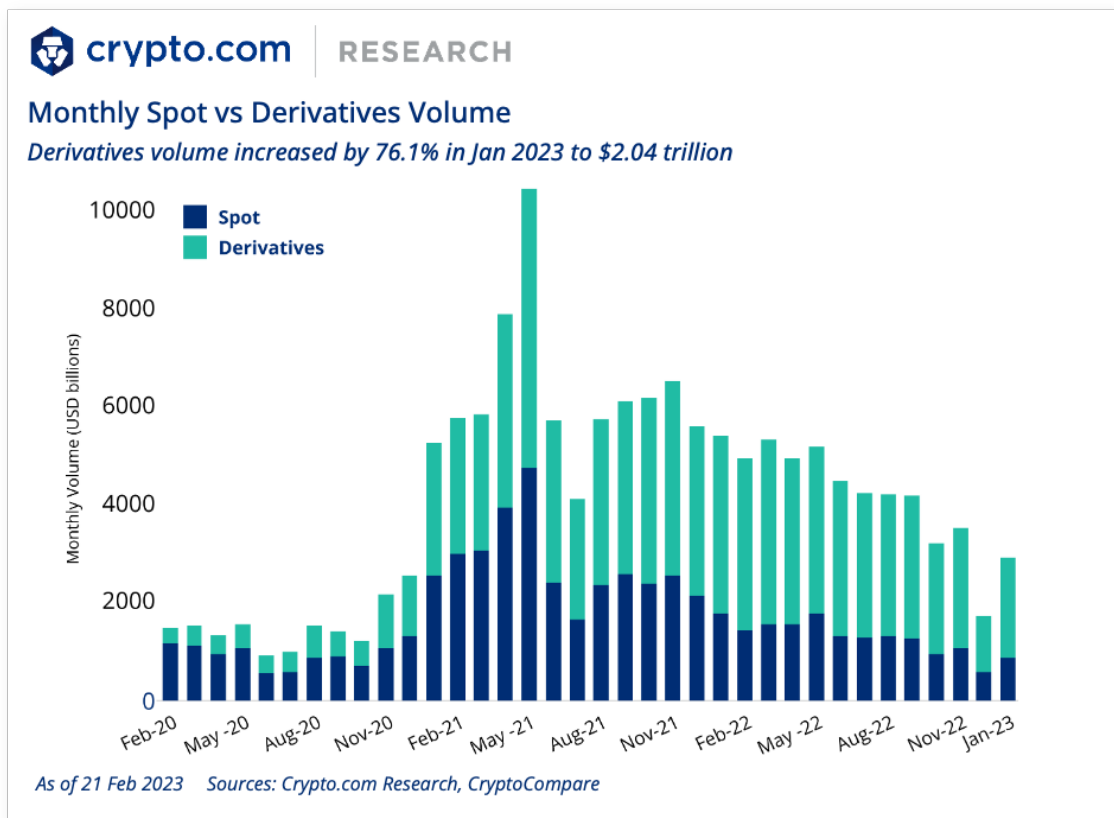
Executive Summary

- The crypto asset market has significantly expanded and rapidly matured in the last few years. One key indicator of this development is the growth in the crypto derivatives market, which represents about 70% of the entire crypto market and is worth US\$2.04 trillion today.
- Crypto-native centralised exchanges (CEXs) take the lead in derivatives trading volume by a wide margin. On the other hand, derivatives in DeFi have also been under the spotlight since 2022, evidenced by the sustainable growth of GMX and Gains Network during the bear market.
- Mainstream derivatives offered in DeFi today are perpetual futures and options:
 - **Perpetual Futures:** Unlike in traditional markets, perpetual futures have come to flourish in crypto, steadily rising in popularity. GMX, Gains Network, dYdX, and Perpetual Protocol are just some of the key platforms that represent the space today, offering a diverse suite of derivatives features. Cronos-based Fulcrom Finance is one of the emerging players in the space, as well.
 - **Options:** Options trading protocols are also thriving in the decentralised derivatives market. Dopex is pioneering the development of OpFi, which utilises options to power DeFi infrastructure.
- Aside from perpetual futures and options, there are other derivative types in the market today:
 - **Everlasting options** are considered the equivalent of perpetual futures, giving traders long-term options exposure without having to roll their positions forward.
 - **Power perpetuals** are perpetual derivatives indexed to a power of the price of an underlying asset. A quadratic power perpetual like Squeeth draws parallel to a perpetual swap, tracking the price of ETH to the power of two.
- With the innovative and secure design of derivatives in DeFi, as well as increasing user education in the space, decentralised derivatives can easily become important instruments for hedging risk and pursuing better transparency, which could indicate a strong future.

1. Introduction

The crypto asset market has significantly expanded and matured rapidly in the last few years. This translates into many vectors, including the emerging innovations in the trading space, amongst others, and one key indicator of this development is the rapid growth of the crypto derivatives market.

Crypto derivatives draw parallel to traditional derivatives products, referencing underlying digital assets or variables, most commonly Bitcoin and Ethereum. As of January 2023, crypto derivatives continued to dominate the market, representing about 70% of the entire crypto space, and are worth US\$2.04 trillion today. While far from the volume levels seen in May 2021, this still recorded a [percentage increase](#) of 76.1% from December 2022.



Mainstream derivatives offered in the crypto market today are futures, perpetual futures, and options, which are what we focus on in this report. To differentiate each:

- **Futures:** A futures contract is an agreement between two parties to purchase and deliver an asset at an agreed-upon price at a future date.

Parties involved in this type of transaction are obligated to fulfil a commitment to buy or sell the underlying asset.

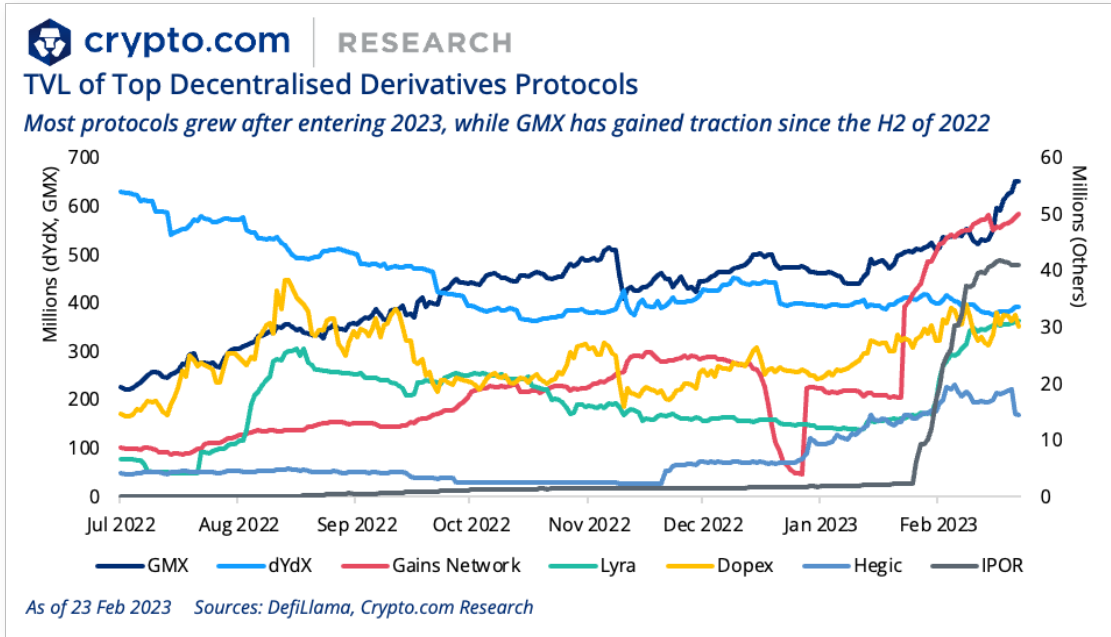
- **Perpetual futures:** A perpetual futures contract is a permanent, never-delivered futures contract that uses a daily pricing/settlement mechanism, unlike the classic futures contracts, which are settled on the expiry date. A 'Mark Price' is used to calculate the profit and loss of the user's position, and for the settlement price to maintain market stability.
- **Options:** An options contract gives the buyer (the owner or holder of the option) the right, but not the obligation, to buy (call option) or sell (put option) an underlying asset at a [strike](#) price on or before the expiry date. The option seller has the corresponding obligation to fulfil the transaction — to sell or buy — if the buyer (owner) exercises the option.

Check out our [University article](#) for a primer on put and call options.

The rise of relevant infrastructure and increased institutional participation are some of the factors helping to drive growth for crypto derivatives volume, which we discuss in more detail below. It is also worth understanding why derivatives have an important role in the overall crypto and financial market:

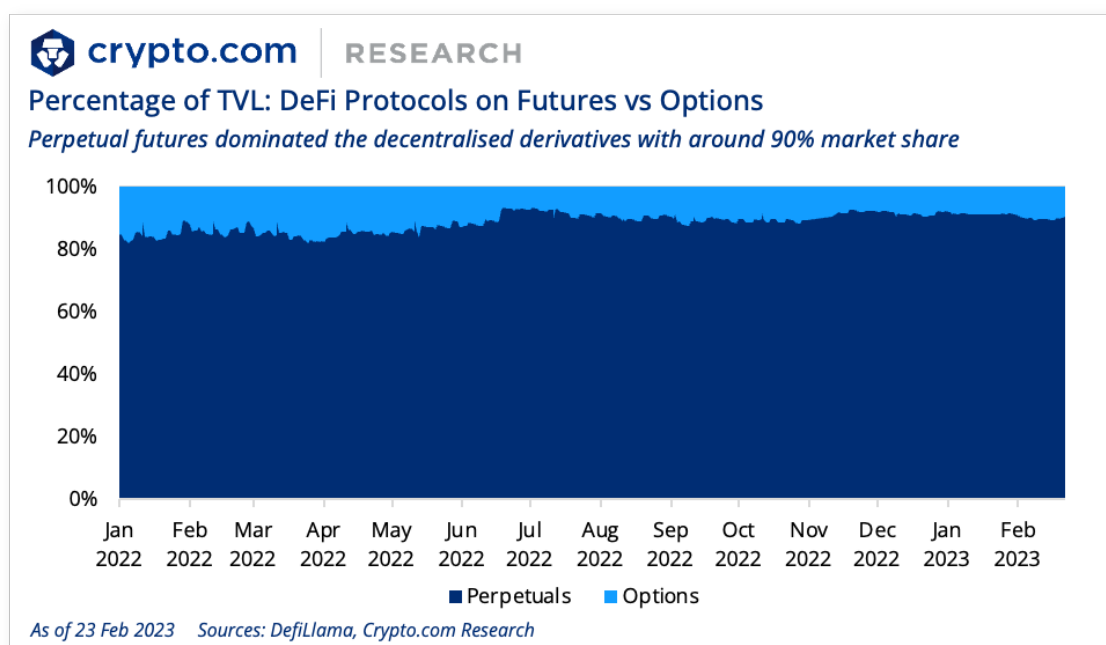
1. **Capital efficiency:** They offer the chance to maximise returns when trading on margin.
2. **Risk management and hedging:** They allow traders to maintain long-term exposure while temporarily hedging.
3. **Diversification:** They open up the market for more sophisticated trading instruments and strategies, and traders can gain exposure to an underlying crypto asset's price fluctuation without actually owning it.

Centralised crypto exchanges still lead the crypto derivatives market by a wide margin in terms of trading volume. However, decentralised derivatives displayed significant growth last year. There are certain benefits that DeFi derivatives offer today, such as higher transparency and innovative system design, and projects like [GMX](#) have gained traction during the bear market in 2022.



2. Decentralised Derivatives

Overall, derivatives are still in a minor position in DeFi: the TVL in derivatives stands at [US\\$1.7 billion](#), which accounted for 2.4% of the total DeFi TVL as of this writing. At the same time, **data shows that perpetuals are the main derivatives product in DeFi, as they contributed 90% of TVL of decentralised derivatives.**

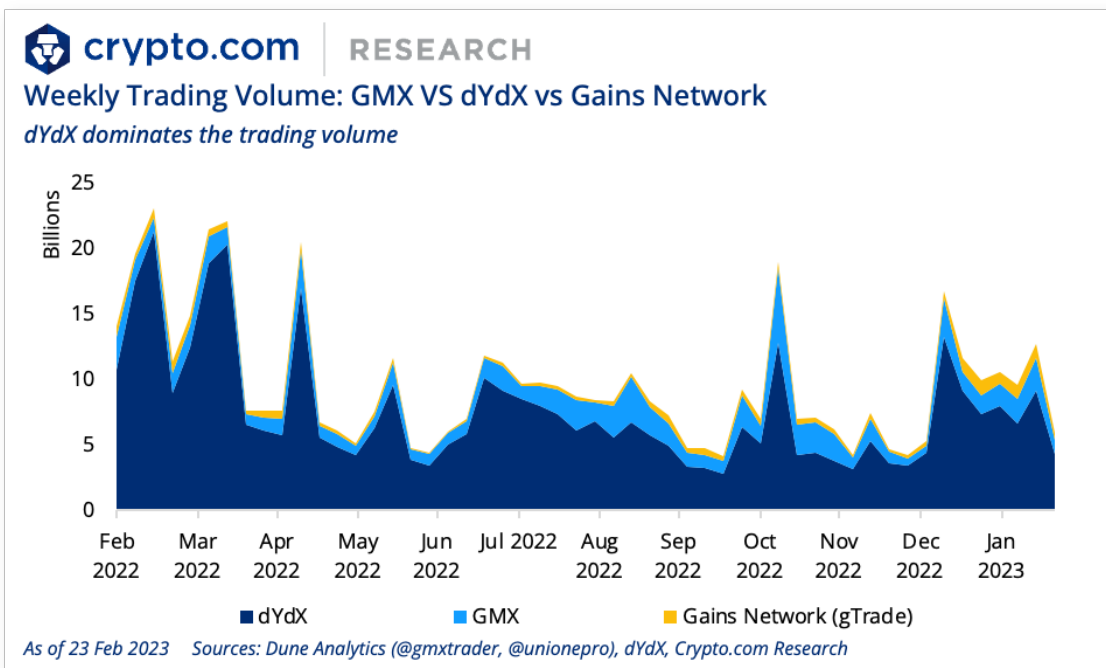
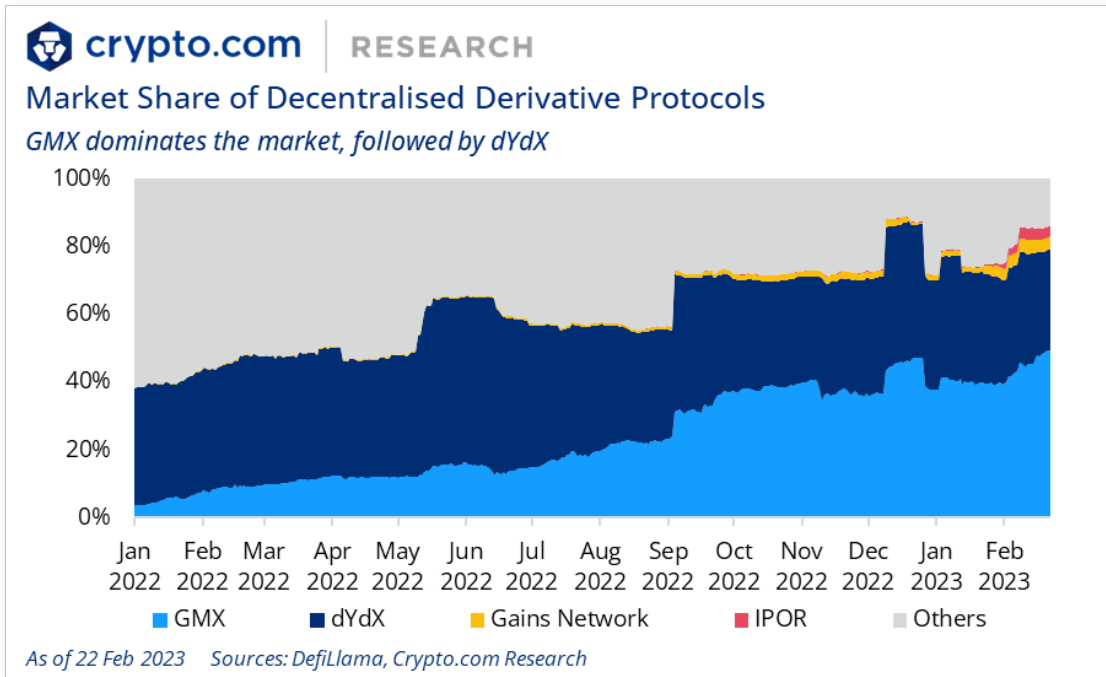


In the following sections, we introduce the decentralised futures (mainly perpetual futures) and options in order to explore their development in the market.

2.1 Futures

Currently in the DeFi arena, almost all of the futures products are perpetual futures, and they dominate the overall decentralised derivatives market, as shown above. The concept of perpetual futures, also known as perpetual swaps or perps, was first [introduced](#) by economist Robert Shiller in 1992 as a way to offer ongoing exposure to an asset price in a derivatives contract — hence, perpetual. In traditional finance, perps have not fully gained significant traction. However, they have come to flourish in crypto, steadily rising in popularity since their introduction to the market by [Bitmex](#) in 2016.

Amongst the perpetual futures protocols, **GMX, dYdX, and Gains Network have taken the spotlight since 2022, as they gained the most market share based on TVL.** Furthermore, GMX's TVL accounted for over 48% of overall perpetual TVL, followed by dYdX. However, when looking at the trading volume, dYdX was 4x as large as the sum volume of GMX and Gains Network combined.

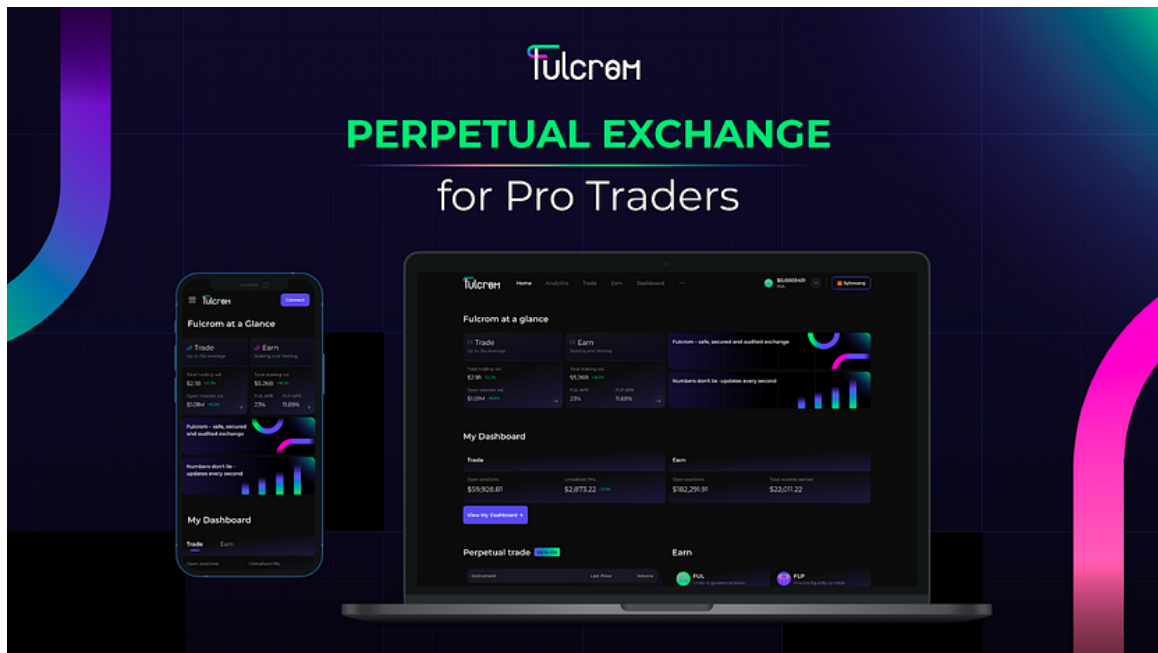


In CEXs, perpetual swaps' **funding rate** is a metric that can be utilised to directionally gauge leverage and market sentiment. If the perpetual contract price is higher than the underlying asset's spot price, then the funding rate is positive and the long position holder would have to make a funding payment to the short position holder. Meanwhile, if the perpetual contract price is lower than the underlying asset's spot price, then the funding rate is negative and the short position holder would have to make a funding payment to the long position holder. In general, the reason for the funding payment is to encourage the price of each perpetual market to be [close to its spot price](#). For example, the longs have to pay shorts when the perpetual contract price is too high, which encourages more traders to sell or go short, thus lowering the price (and vice versa).

However, with decentralised derivatives, funding payment is not always guaranteed. For example, there is no such thing as funding payment for GMX. Instead, trading is based on the [Borrow Fee](#) that is deducted at the start of every hour. This fee is paid to the counterparty of the user's trade (the LP), and the fee per hour will vary based on utilisation of the asset, with higher fees for more utilised assets. For Gains Network, there is a [Funding Fee](#) that is based on the relative popularity of trades. This fee adds value to the position on the side that is less exposed. For instance, if most people are long, a trader will be compensated for holding a short position open. On the other hand, it will cost fees for the side that is more exposed: a trader going long when the majority of people are already holding long positions, for example. Ultimately, this fee changes from either positive or negative during the life of a trade, depending on others' positions.

A deep-dive analysis on GMX and Gains Network protocols is also available in our [latest research report](#).

New entrants like Fulcrom Finance provide alternative venues to trade perpetual contracts. Fulcrom is a [decentralised perpetual exchange](#) for professional traders that is built on the Cronos blockchain, offering innovative on-chain derivatives and providing traders with a safe and dependable way to access them on Cronos. In contrast, centralised exchanges offer perpetual contracts. Fulcrom allows users to trade leveraged positions for up to 25x with low fees and negligible price impact, while also ensuring that all transactions and collateral are transparently recorded on the blockchain. In addition, the expanding Cronos DeFi network presents opportunities for the Fulcrom trading platform to integrate with other DeFi dapps for higher accessibility to liquidity.



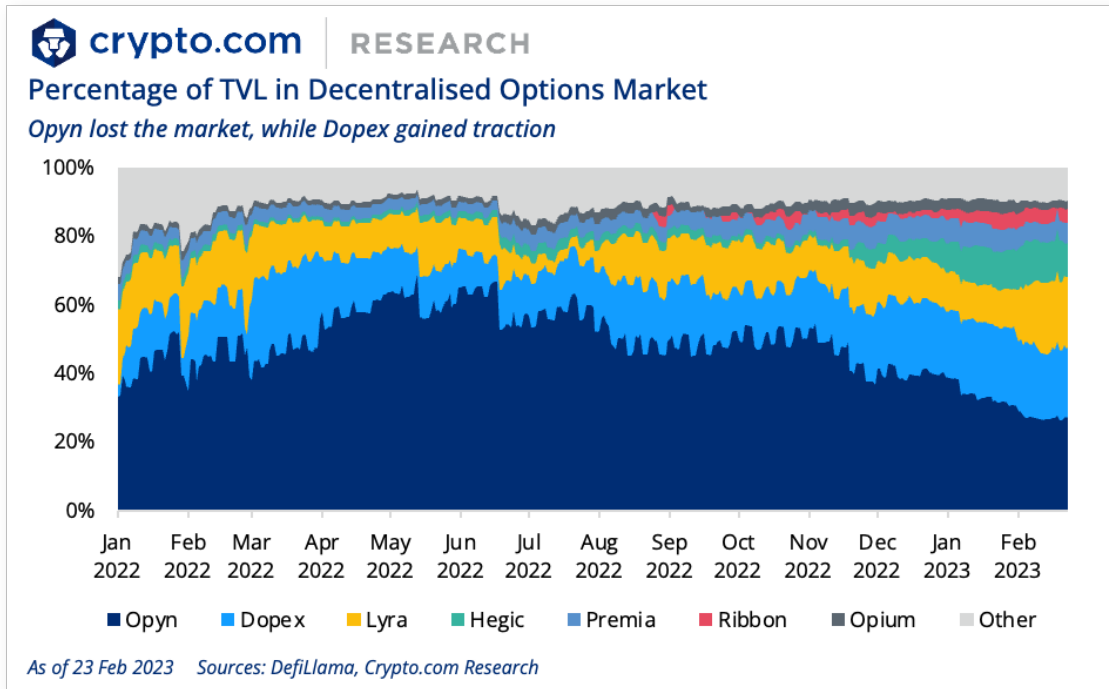
Source: [Medium @FulcrumFinance](#)

2.2 Options

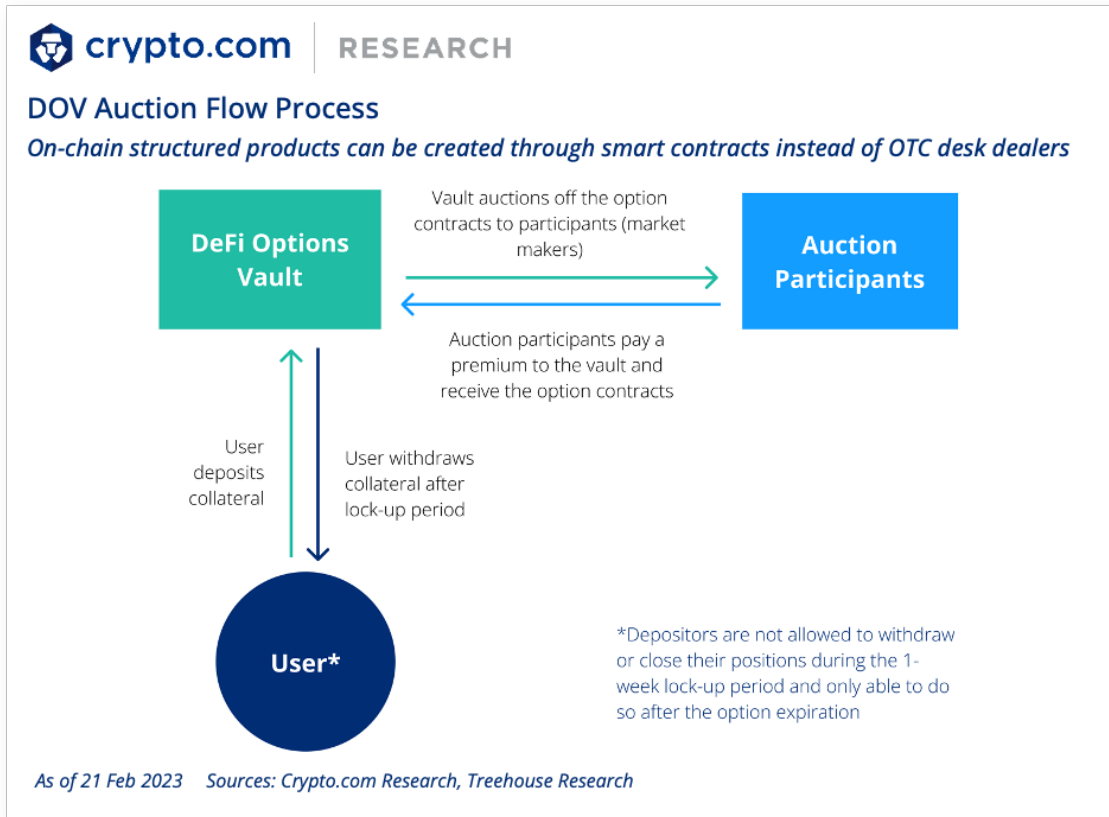
Although options trading in DeFi is not as popular as perps, they still play an important role in hedging, just like in traditional finance. Since the beginning of 2023, TVL in DeFi options platforms have surged by around 40% compared to Q4 2022.

Additionally, in 2022, Dopex and Lyra, which are options protocols built on Layer-2, came into the spotlight; [Opyn](#), a DeFi options trading protocol on Ethereum, gained traction in the first half of 2022 but lost the market in the second half. Furthermore, **Dopex proposed the concept of 'OpFi' (Options-powered DeFi)**, which is seen as the next driver in DeFi. In simple terms, OpFi is the use of options to power DeFi infrastructures, helping to remove the complexity of DeFi on behalf of users by offering products that achieve standard DeFi functions through the use of options in the background.

Interested readers can learn more about [OpFi in our latest private report](#).



At the same time, DeFi Options Vault (DOV) also recently developed at a fast pace. **DOVs are options-based products that enable users to simply deposit their collateral in the vaults**, which then execute yield-generating strategies on behalf of the investors. Prior to the creation of DOVs, option strategies were mainly available only to accredited investors through over-the-counter (OTC) trading or by self-execution on options exchanges.



To get an idea of how the vault executes the strategy, consider the DOV auction flow process visualised above.

- Users deposit underlying tokens as collateral for call-selling vaults and stablecoins for put-selling vaults, which undergo a 1-week lock-up period.
- The vaults write the options and auction them off to market participants on a predetermined day and time, and the protocols decide the option parameters to yield the highest risk-adjusted returns for depositors.
- The vaults receive the premium after auctions. Vault depositors can then either take back their deposit, including premiums, or keep it in the vault for the next auction.

2.3 Other Derivative Types

Everlasting Options

Everlasting options are considered the equivalent of perpetual futures for options. Inspired by the successful perpetual futures product, **an everlasting option can give traders options exposure for as long as they want without**



having to roll their positions. By removing the expiry date, it eliminates the number of options and forces the liquidity to become more concentrated, which should help solve the issue of [liquidity fragmentation](#). Deri is the representative in the everlasting options market.

Everlasting options work like a portfolio of options with the same strike price and varied expiry dates. The options in the portfolio have expiry times of 1, 2, 3 days and so forth, with weights of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$. When each option expires, the portfolio automatically doubles the position of other options so that the portfolio returns to its original position. Thanks to this mechanism, everlasting options have no expiration. When each rebalance occurs, there will be one option in the portfolio that expires, and the trader needs to buy new options. This costs the trader the funding payment.

The only difference between everlasting options and perpetual futures is that the funding fee is calculated as the difference of the mark price and the current payoff of the option. Instead of (mark minus index), the funding fee is (mark minus payoff), where:

- 'Index' is the current price of the underlying asset
- 'Mark' is the everlasting options price being traded
- 'Payoff' is the profit after one option in the portfolio matures

For traders to maintain a long position, funding fees need to be paid to a short position. Since traders do not have to trade with market makers on an ongoing basis, it is only when they are entering or exiting a position that they have to pay spreads or incur operational risk. A couple of use cases for everlasting options are outlined below:

Case 1 — Buy everlasting options for hedging risk

Alice holds 1 BTC and would like to ensure that she will always be able to sell her position for at least US\$20,000 per BTC. She can do so by going long for an everlasting put option (EO Put).

There are two possible scenarios here based on the direction of BTC price in relation to the strike price. If the current price of BTC decreases (from a strike of \$20,000), Alice would be protected from the downside market risk: The mark price of the put option instantly increases by around US\$5,000, which is the value of Alice's unrealised [PnL](#) from the put option she holds. If the BTC price remains or goes over US\$20,000, there will be no change to her PnL. This strategy works as long as she maintains her long position.

	BTC Price > \$20,000	BTC Price = \$15,000
EO Put unrealised PnL	0	+\$5,000
Alice's portfolio value	BTC price	\$20,000

Please note that, since there is no expiration, Alice cannot "exercise" the everlasting put options. She needs to sell the everlasting options to realise her profit on it.

Case 2 — Sell everlasting options to earn premiums

Bob predicts the BTC price will not go below US\$20,000 and would like to make profits from such a judgement; he could sell put options of BTC with a strike price of US\$20,000 to collect the option premiums, which he can do via shorting an everlasting put option.

By making sure he has enough collateral in his margin account, Bob can keep earning premiums from the long positions. But this turns around if the BTC price decreases, which means he instantly loses US\$5,000 in his unrealised PnL. This strategy works in his favour as long as he maintains his short position and margin requirements are met.

	BTC Price > \$20,000	BTC Price = \$15,000
EO Put unrealised PnL	0	-\$5,000
Bob's overall PnL	Funding fee collected	Funding fee collected - \$5,000

Please note that, since there is no expiration, this unrealised PnL would only be "realised" upon the close of the position.

Power Perpetuals

A power perpetual is a perpetual derivative indexed to a power of the price of an underlying asset, like ETH. Power perpetuals are considered to be a more specific implementation of everlasting options by removing strike prices.

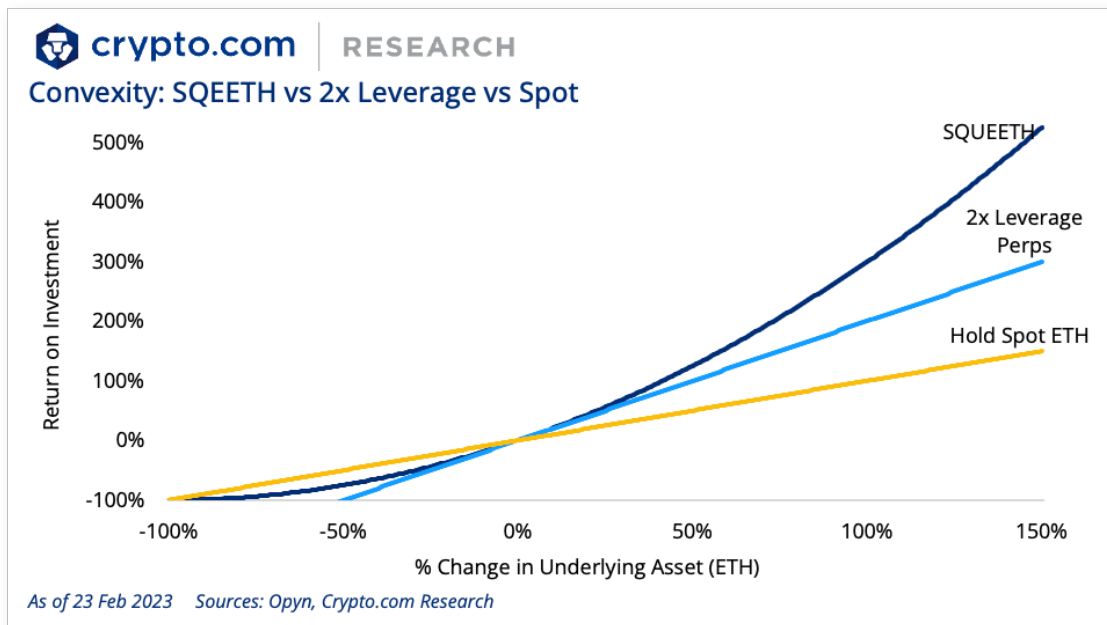
The appeal of power perpetuals lies in the fact that potential returns are exponential (e.g., an ETH² power perp can easily go 4x if ETH doubles in price). This is because power perps with powers greater than one have positive [convexity](#): Market participants earn yields faster if the asset price moves in their favour, and lose money more slowly if the price moves the other direction. To

understand how it plays out in actual pricing, consider the sample below, where the payout is more when the spot price increases by 10% compared to when it decreases by 10%:

$$(1 + 0.1)^2 = 1.21 = 21\% \text{ return for a } +10\% \text{ move}$$

$$(1 - 0.1)^2 = 0.81 = -19\% \text{ return for a } -10\% \text{ move}$$

Squared ETH (also known as Squeeth or ETH²) is a modern innovation in the crypto derivative space, offered by Opyn. **A quadratic power perpetual like Squeeth draws parallel to a perpetual swap, tracking the price of ETH to the power of two, rather than ETH.** It provides options-like exposure minus the need for either strikes or maturity dates while consolidating much of the options market liquidity into a single instrument.



Compared to a 2x long position, there is less downside and greater upside. Anchoring from the concept of positive convexity as previously mentioned, this leads to an asymmetric payoff wherein there is higher upside and lower downside when compared to perpetuals and other instruments. Squeeth offers marginally higher returns compared to other derivatives, and long Squeeth gives a more favourable payoff than 2x leverage. However, there is no free lunch in crypto: If the market goes sideways, then funding rates will be higher on convex instruments, which can potentially eat into returns.

There are many other use cases for Squeeth other than buying and selling:

- **Automated Squeeth strategies:** Executing crab, bull, or bear strategies

- **Uniswap v3 SQTH-ETH liquidity providers:** Earning LP fees for providing SQTH-ETH liquidity
- **Hedging Uniswap v3 LPs:** Enabling hedging with almost [no impermanent loss \(IL\)](#)
- **Hedging all ETH/USD options:** No strikes or expiries make Squeeth an optimal choice for hedging

3. Conclusion

With all the development and innovation coming from different sides of the market, there is no doubt that decentralised derivatives offer substantial opportunities for market participants while increasing transparency and decentralisation, plus optimising trades for volatility and risk — all of these against the background of market headwinds and uncertainty.

It is important to note, however, that alongside these advantages, there are some challenges and potentially heightened risks within decentralised derivatives markets. Some of these challenges can include:

- **Decentralised derivative protocols may face lower liquidity** compared to CEXs that offer market-making services as a counterparty.
- **Users face steeper learning curves** and are required to learn new trading techniques due to rapid innovation in the market.
- In addition to the usual risks in DeFi, such as regulatory risk and vulnerability in smart contracts, **decentralised derivative platforms also have additional risks due to the leverage involved.**

With the innovative and secure design of derivatives in DeFi, as well as increasing user education in the space, decentralised derivatives can easily become important instruments for hedging risk and pursuing better transparency. This could indicate a strong future.

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