Automated Strategy Vaults
The world of on-chain autonomous hedge funds: DOVs.

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Abstract: DeFi Option Vaults (*DOVs*) represent a further step in the democratization of complex capital management strategies by providing investors a reliable yield source for all market conditions. The protocols with the biggest market share such as $JonesDAO$, $Ribbon\ Finance$ and implement a variety of approaches running both manual and automatic option operations. When operations are automated, vaults often use a set of keepers to trigger smart contract executions. The most widely used options strategy used for $DOVs$ are *Covered Calls* and *Cash Covered Puts.*

Keywords: Automated Strategy Vaults · ERC-4626 · Options · Capital Managers

Note: throughout this paper we refer to the industry we operate in as DeFi. We believe that a better representation of this would be better named OpFi but we decided to keep the commonly used term for clarity.

Introduction

In our *'Automated Vault Strategies'*- series many of the DeFi protocols building on top of already existing money legos are covered. We refer to these as structured products because they take existing and complex mechanics and build an easy-to-use product around them often by taking away management of capital from the user. It is a revolutionizing aspect of DeFi. Additionally, the composability allows for continuously new iterations, innovations, and advancements to be made.

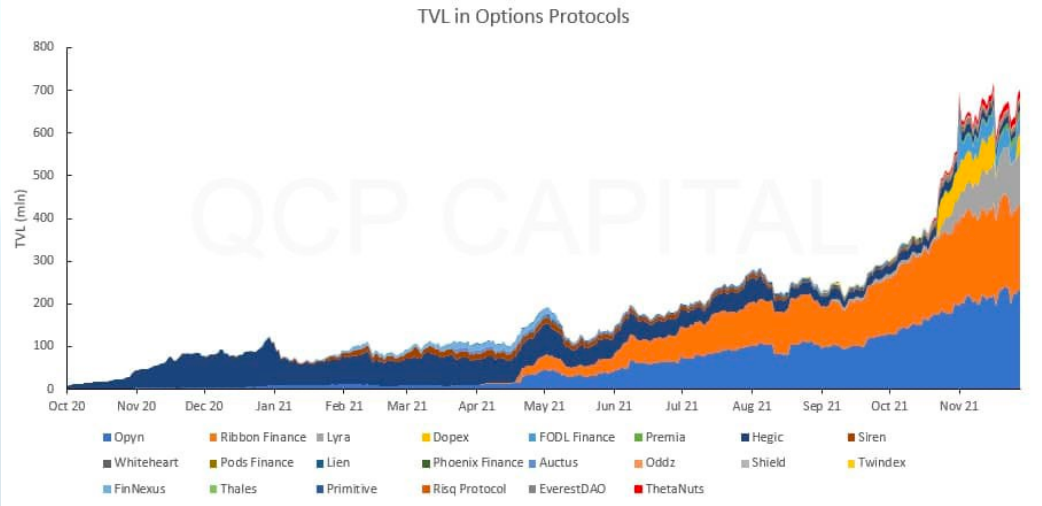
Traditionally, these capital management services were only available to wealthy individuals, because the companies offering similar services are heavily regulated and required to impose strict criteria to their customers. This varies per jurisdiction, but most hedge funds have their clients meet membership criteria of a net worth of at least $\$1mln$, an income of a minimum of $\$200k$ in the last two years or/and a minimum deposit of $\$100k$. These requirements are a result of strict regulations on capital management firms and to ensure that clients are accredited investors and therefore should have the acumen to understand the risks of the strategies that hedge funds typically use. Funds can and do make exceptions to these criteria, usually for the proverbial family and friends, since the SEC allows them to accept up to 35 non-accredited investors over the life of the fund. But they will usually just stick to the accredited-investor guidelines; some set even higher net worth or earned-income level minimums.

DeFi breaks this paradigm and opens up the possibility for anyone to take advantage of hedge fund-like strategies. Due to their decentralized and autonomous nature, smart contracts take care of the management of depositors' funds and are directed by code. Nowadays, there are a wide variety of vault types that will be discussed in each installment of this series.

Options trading is an enormous part of traditional finance with retail investor platforms such as $Robinhood$ counting on this product for around 40% of their revenue. However, as of writing, the $Securities\ and\ Exchanges\ Commission$ is considering new regulation focused on limiting the participation of retail investors to the options market. With both $Fidelity$ and $Robinhood$ being held in a lawsuit over "systematic supervisory failures", the main accusation point stands in letting uneducated users access hazardous financial instruments thanks to the low fees offered.
This limit on accessibility to retail option trading in TradFi could attract a whole new user base to the permissionless setting of DeFi.

DeFi Option Vaults (*DOVs*) projects

A fairly popular segment within the vault industry are DeFi Option Vaults (*DOVs*). This concept has taken off in the second half of *2021* and it is often built on top of options platforms, like *Opyn* or *Dopex*, making options trading more accessible to retail users.



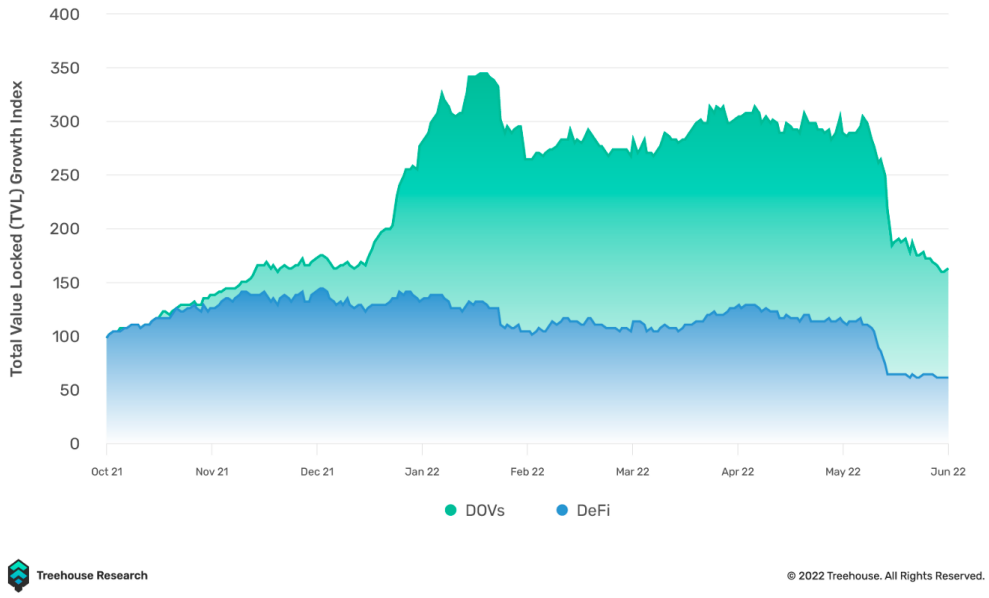
Credit to QCP Capital

Options are an interesting financial derivative instrument which gives access to cheap leverage. The caveat is that options, both American and European, are complex and require deep understanding in order to be properly used. This is especially the case for the more sophisticated strategies that require computational work on the premiums, delta, strike price, and finding the right dates to create the most optimal position.

This is where *DOVs* supposedly come in. These projects bring simplicity to the market by offering structured products that deploy deposited capital in compounding option strategies. In almost all cases, these strategies are covered calls or cash-covered puts that provide a base yield ranging between$10\%\ to\ 15\%$. Compared to other yield sources, like lending or staking, this base yield is relatively high and organic, which is probably the reason why *DOVs* are currently popular. *DOVs* make implied volatility an accessible trading product for retail and investors.

Heading towards the end of 2021, *DOVs* were growing at a similar pace to the broader DeFi space but they began to take off by December 2021, when they notably started to outgrow the entire DeFi sector.

Figure 1: DOVs Growth Rate Outpaced Broader DeFi since Q421
in percentage



Credit to Treehouse Research

Note that DeFi Option Vaults cannot be perceived as a passive investment strategy, but as a tool to amplify yield or adjust market positioning. The yield on the vaults is subject to change depending on the price movements of the underlying and the options bought and sold by the strategy. For example, a cash-covered put strategy may incur a negative yield in case the puts expire in-the-money.

A popular narrative within the crypto options landscape is multi-layered yield. As a depositor in a DOV, one has the opportunity to earn yield from various sources. The first one is the base yield provided by options buyers. In options terminology, this is the premium paid for buying the options and is often denoted in the underlying crypto asset of the product. The second and third layer can be added at the discretion of the protocol in the form of token rewards and staking yield.

The most common and profitable strategies offered are Covered Calls and Cash-Covered Puts.

Covered Calls

The covered call strategy involves selling call options on an asset already owned by the seller to generate passive yield. Option buyers pay a premium to the seller and in return receive the right to purchase the asset upon the options' strike price. This strategy involves full collateralization of the call options, hence the name *covered* calls. By owning the underlying asset, you're "covered", i.e. protected, for when the asset rises and the call option expires in the money. A covered call is one of the lower-risk option strategies. As a covered call seller, you are neutral to moderately bullish on the market and sell the potential upside of the underlying token.

Cash-Covered Puts

A cash-covered put involves selling an out-of-the-money put option while simultaneously setting aside the capital needed to purchase the underlying asset at the option's strike price. Cash-covered puts work similarly to covered calls, but in the opposite direction. Sellers of cash-covered calls put up stables against an underlying asset and are anticipating that an asset's market value will stay above a certain price.

Jones DAO

Website URL:	https://www.jonesdao.io/
Chain:	Arbitrum.
Token(s):	$JONES, veJONES$.
Options market:	$Dopex$.
Automated:	Managed by the team.
Supported tokens:	$ETH, DPX, rDPX, gOHM$.
Fee structure:	2% on withdrawal, 20% on performance. No fees are charged until the fee sharing for $veJONES$ holders is live.
Strategy offered:	Covered Calls, Cash-Covered Puts.
Auctions:	Transparent process, using $Dopex$.
Audit:	Audited by $Solidity\ Finance$.
Roadmap:	Complete decentralization and vary their vault offering (auxiliary vaults, LP vaults, and meta vaults); Enable borrowing and lending against $jAssets$.

Pros	Cons
Delegating asset management to strategists secures competitive yields.	$Solidity\ Finance$'s audit reported that control is pretty centralized.
$jAssets$ can be a piece of infrastructure for other protocols.	Currently offering very few tokens and types of vaults.
Lots of clever brains involved: Tetranode, DeFi God, David Iach, and Halko. Jones has already partnered with $Olympus\ DAO$,	Fee on revenue generated (20%) is pretty high compared to the competition.

Redacted, *Dopex*, *GMX* and *Plutus*.	

Ribbon's Theta Vaults

Website URL:	https://www.ribbon.finance/
Chain(s):	Ethereum, Avalanche, Solana. Custom EVM rollup for $Aevo$.
Token(s):	$RBN, veRBN$.
Options market(s):	$Opyn$ and $Airswap$ for Ethereum and Avalanche, $Zeta$ for Solana. $Gnosis$ for on-chain auctions. Eventually also $Aevo$ for all of their options creation and auctions.
Automated:	Yes. Options strikes are selected algorithmically.
Supported tokens:	Blue-chips.
Fee structure:	2% on withdrawal, 10% on performance. No fees if unprofitable.
Strategies offered:	Covered Calls, Cash-Covered Puts.
Auctions:	Transparent auctions using $Gnosis$.
Audit(s):	Audited by $OpenZeppelin$, $ChainSafe$ and $Peckshield$. Running an $Immunefi$ bug-bounty.
Roadmap:	They plan to expand their services by launching a proprietary money market called $Ribbon\ Lend$ and an on-chain options order book platform, $Aevo$.

Pros	Cons
Ribbon offers a treasury service which allows protocols to sell covered calls using their governance tokens. This can help protocols to increase the health of their treasury without market selling tokens.	Deposits can not be withdrawn anytime as they have a fixed date. However, with the launch of $Aevo$, Ribbon's vault depositors will be able to close their vault positions anytime by closing them on the DEX.

If funds are not used, they are deposited in $Yearn$, guaranteeing consistent minimum yield.	Strongly dependent on $Opyn's\ oTokens$.
Their $ThetaVaults$ bundle transactions together allowing UX to be straightforward and cheap.	Strongly relying on VC funding. ($Paradigm, DragonFly\ Capital, Coinbase\ Venture$ s…)
Getting traction - second biggest vault protocol by TVL.	Projected APY does not represent the historic APY. Misleading.

bStakeDAO's Options Strategies

Website URL:	https://stakedao.org/
Chain:	Ethereum.
Token(s):	$SDT, veSDT, StakeDAO\ NFTs.$
Options market:	$Opyn.$
Automated:	Yes.
Supported tokens:	$ETH, wBTC.$
Fee structure:	0.5% on withdrawal, 15% on performance.
Strategies offered:	Covered Calls, Cash-Covered Puts (only ETH), Black Swan Hedge strategy.
Auctions:	Not transparent, done through $Airswap$'s OTC and only for whitelisted entities.
Audit:	Audited by $Chainsecurity$.
Roadmap:	Improved UI, the addition of new liquid lockers, strengthening the derivatives vertical with a newly designed platform, implementation of premium strategies.

Pros	Cons
Hosting an academy where they teach everything related to DeFi and Crypto.	Strategies are very simple and therefore not needed for users that are experienced in DeFi.
Every strategy has a safety score giving users an idea of the security side.	Strongly dependent on $Opyn's\ oTokens$.
$sdTokens$ represent liquid versions of ve governance tokens while preserving full voting rights.	Not all of the strategies proposed are profitable - the ETH put selling strategy has a considerably high negative APY.

Offers other vault products resulting in a differentiated offering.	*GitHub* repository needs overhauling and is very difficult to navigate.

Friktion's Volts

Website URL:	https://friktion.fi/
Chain:	Solana (Ethereum and Avalanche deposits are supported via $Wormhole$).
Token:	No token, Lightning OGs NFTs.
Options market:	$Zeta$.
Automated:	Yes.
Accepted tokens:	Blue-chips and some Solana alts.
Fee structure:	0.1% at withdrawal, 10% on performance, $0.5\% - 1\%$ on execution on selected vaults.
Strategies offered:	Covered Calls, Cash-Covered Puts, Crab Strategy, Basis Yield Strategy, Delta-Hedged Short Power-Perpetual. All strategies are customizable on risk appetite.
Auctions:	Transparent, gradual on-chain Dutch Auction using $Channel\ RFQ$.
Audit:	Audited by $Kudelski\ Security$. Running a bug bounty program.
Roadmap:	Includes helping DAOs manage their treasuries, launching an institutional credit arm, and aims to strengthen decentralization

Pros	Cons
Able to offer attracting APYs $\sim 30\%$ and a differentiated product set.	Only running on Solana, which ultimately means less yield-generating strategies and access to capital due to a smaller ecosystem.
Huge set of partners - this allows them to enhance composability and liquidity.	Both deposits and withdrawals are paused until the end of an epoch.

$fTokens$ could be accepted by other protocols as collateral unlocking further composability.	The protocol does not have a public software repository and public smart contracts are hard to find.
	Oracle's front-running is not mitigated by the protocol.
	No sufficient $Timelock$ documentation is provided and its length does not seem adequate.

Thetanuts Finance

Website URL:	https://www.thetanuts.finance/
Chain(s):	Ethereum, Polygon, BNB Chain, Avalanche, Fantom, Boba, Cronos, Aurora.
Token:	No token.
Options market:	Does not have third-party dependencies.
Automated:	Partially. Strike prices are selected automatically but the management of auctions is done manually.
Accepted tokens:	Multiple blue chips and alts.
Fee structure:	No performance fees or swap fees are charged.
Strategies offered:	Covered Calls, Put Selling, Bull Put Spreads, Bear Call Spreads, Flat Iron Condor.
Auctions:	Not transparent, done through *Airswap*'s OTC and only for whitelisted entities.
Audit(s):	Audited by *Auddefi, Akira Tech, Zokyo, Peckshield*.
Roadmap:	Not public. Plans to offer more exotic strategies.

Pros	Cons
Does not rely on any third-party option market.	Strongly relying on VC funding. (3AC, Crypto.com Ventures, Jump Crypto…)
V1 Tech Stack integration enhanced capital flexibility. Users can now deposit and claim requested withdrawals without having to wait for the settlement of the new epoch.	

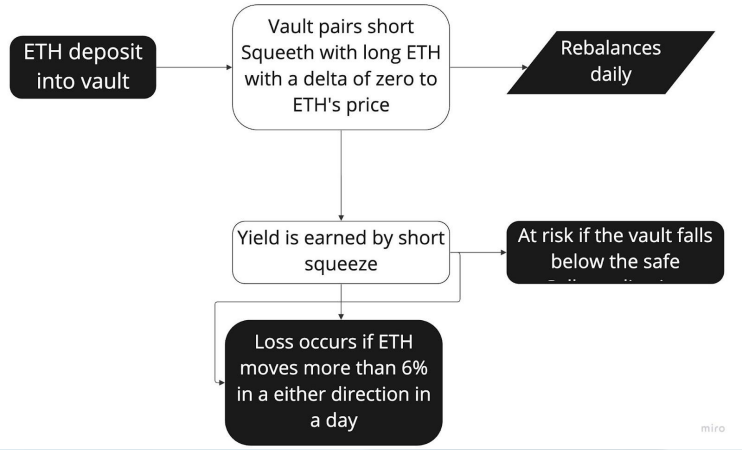
Opyn Squeeth

Website URL:	https://opyn.co/
Chain:	Ethereum.
Token:	$oSQTH$.
Fee structure:	Users with a long Squeeth pay a fee as a percentage of their position to those who are short Squeeth.

Among an orderbook option marketplace, $Opyn$ offers Squeeth (Squared-eth) contracts that allow users to long or short the index of ETH^2 perpetually. The token Squeeth ($oSQTH$) provides global options-like exposure (pure convexity, pure gamma) without the need for either strikes or expiries, effectively consolidating much of the options market liquidity into a single $ERC-20$ token that allows for perpetual positioning. Longing Squeeth gives investors a leveraged position with a protected downside and no liquidations for the cost of a funding fee. Shorting Sqeeth allows traders to get the funding fee that the longs have to pay.

Besides its trading offerings, $Opyn$ offers automated Squeeth strategies allowing users to earn yield while the contract handles the strategy. The *Crab strategy* is very similar to selling a continuous straddle that resets periodically at the money, representing the classic short volatility strategy. This is a strategy performing best in sideways markets with ETH moving less than 8.53% in either direction between 2 day hedges. Profits are in USD and they plan to stack ETH if the price drops while selling it while the price increases. The strategy rebalance is conducted daily or upon a huge move in ETH's price, with the goal of being delta neutral by buying or selling ETH vs. Squeeth. The gamma exposure of the strategy is constantly negative.

The flow of the strategy is as follows:



The crab strategy depositors are paid a daily funding rate by long Squeeth holders and there are no protocol fees. Note that while Squeeth itself has no liquidations, if the Crab Strategy falls below the safe collateralization threshold (150%), the strategy is at risk of liquidation.

The liquidation risk is hedged through the constant rebalance, but the strategy can turn out to be unprofitable if ETH moves more than 6% in a single day in either direction.

Crab v2 introduces a new auction mechanism in the daily hedging. To remain delta-neutral the crab strategy swaps Squeeth to ETH by selling Squeeth if ETH price is down since the last hedge and the delta is positive, or by buying Squeeth if the ETH price is up and delta is negative. The auction is either triggered by a minimum amount of time passed by ($\sim 2\ days$) or by a significant price move in ETH. Users are able to participate in the auction.

The v1 of the platform had been audited by $Trail\ of\ Bits, Akira, Sherlock$ and independent auditors. Additionally, the platform runs an insurance and a bug bounty program. Squeeth has been integrated into $Ribbon$ and $StakeDAO$. The team is currently developing both bull and bear strategies. The v2 platform, dubbed as $Gamma\ protocol$, enhances capital efficiency and options flexibility allowing for partially collateralized options, flash minting of $oTokens$ and the combination of straddles, strangles, wheel and principal protected notes into options strategy. The newer version of $Opyn$has been audited by $OpenZeppelin$ and formally verified by $Certora$.

Pros	Cons
Able to offer no fees on the platform. However Users with a long Squeeth pay a fee as a percentage of their position to those who are short Squeeth.	Yield is dependent on Squeeth holders funding rates.
Profitable in most types of markets (sideways with	Strongly relies on ETH implied volatility (IV),

a daily deviation on ETH of max 6%).	this in turn heavily affects the portfolio return.
The team is developing a different offering allowing users to both short and long volatility.	Oracle's front-running is not mitigated by the protocol.
Clear software architecture and well-maintained $Github$ repository.	No sufficient $Timelock$ documentation is provided and its length does not seem adequate.

CeGa

Website URL:	https://www.cega.fi/
Chain:	Solana. Plans to go cross-chain.
Token:	No token. NFT collection.
Fee structure:	15% on performance, 2% on assets managed.

The Cega protocol utilizes DeFi options to power an exotic derivative, fixed coupon notes (*FCNs*), by combining vanilla options with additional features and customizations. $Cega$ is an actual term in derivatives trading that refers to $\frac{dCorrelation}{dSpot}$. This formula refers to how much the trade PnL changes based on the correlation between assets changing.

The first main products on the platform are called *Fixed Coupon Notes* (*FCNs*) and are available in five vaults. Some of these vaults are gated and require the possession of the *Cega NFT*. The FCNs combine equity options and bond-like characteristics. Users of Cega's FCNs earn interest on their deposited capital until expiry and, upon expiry, are able to redeem their principal, with the withdrawal amount depending on the price performance of the underlying tokens. This allows investors to earn a continuous yield in any market condition with the yield coming from market makers (*MMs*) who buy the underlying options to hedge their books, i.e. acting as insurance.

The fixed coupon notes are composed of a basket of two/three short puts that earn yield for the depositor. They also hold one long call option that incentivizes the *Knock-Out* event. Upon expiry, only the worst-performing put option is exercised and only if it is in-the-money.
The *Knock-Out* feature allows the FCNs to expire early in case the price of the underlying exceeds a certain threshold. In that case, investors of FCN are able to earn better yields and compound at a faster rate. There is also a *Knock-In* feature that executes when the price of the underlying falls substantially. This feature is meant to protect investors from the downside, but in case the prices fall more than *50%*, the principal is not returned to the investors.

Deposits for Cega's FCNs products last for *7* days and when they are closed investors are unable to withdraw their principal until the product expires. The FCNs epochs last for *27* days unless the *Knock-Out* or *Knock-In* features are executed. During that time period, investors are paid interest and if they want they can file a withdrawal request for when the product expires.

During the lifecycle of the notes, a fixed daily yield is paid out to the investors and thanks to the *Knock-In* feature, there is also downside protection for investors unless the price falls drastically. The main benefit of FCN is that they are a set-and-forget product as investors can leave their deposited capital and have the returns auto-compounded automatically into a new epoch.

FCNs are still complex financial products and are only suitable for those who understand their risks. The first risk retail investors are exposed to is the credit risk, which triggers when Market Makers default defacto leaving retail investors with a loss. This risk is mitigated by the rating from $Credora$ that *MMs* that interact with the platform have to go through.
Even though FCNs feature a *Knock-In* event that protects against the downside, there is still a risk of principal loss in case the price of the underlying tanks dramatically. Investors should also consider the equity upside risk, as during the FCNs epochs they are not holding the underlying assets directly and are not able to capture the full asset upside.

Cega is backed by *Solana Ventures, Alameda Research, Coinbase Ventures, DragonFly Capital, and Pantera*; They have partnered with $Credora$ to minimize counterparty risk.
The protocol was audited by $Ottersec$ and engaged $Zellic$ as a consultant for the security of their smart contracts. $Ottersec$ signaled four critical and two high findings. All of them have been resolved.

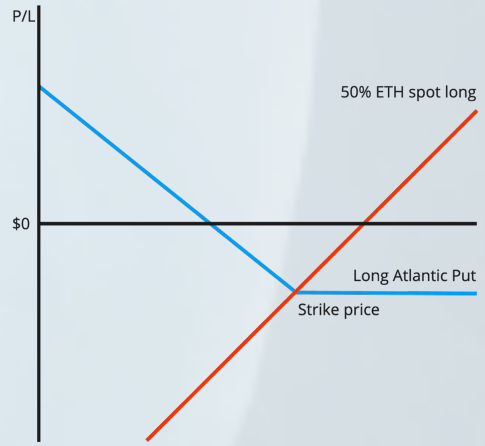
Pros	Cons
Showing great product-market-fit with \$43 mln in TVL as for writing.	Strongly relying on VC funding.
Partnered with $Credora$ for the credit rating of borrowers.	Users are exposed to the Market Makers counterparty risk.
All vaults have price protection varying from $30\%\ to\ 90\%$ of the assets value.	
The team is composed of four people who have experience in important roles in Web2 and TradFi companies.	

Dopex Atlantic Straddles

Website URL:	https://dopex.io/
Chain:	Arbitrum.
Token(s):	$DPX, rDPX$.
Fee structure:	0.02% on option purchase, 0.01% on option exercise.

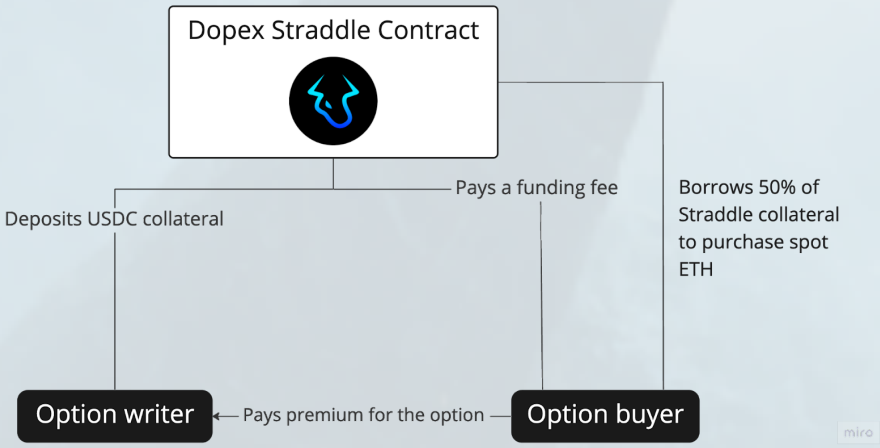
We have discussed Dopex and its innovative options model in one of our previous papers, "*Undercollateralized loans*". In that paper, the focus was on the technicalities around Atlantics and the functioning of its borrowing feature. We discussed how Atlantics can best be understood as a hybrid between European and American options that have a set expiry date, but the underlying collateral can be moved elsewhere. This increases capital efficiency and opens up the door for interesting use cases and products. As an example, we outlined the idea of lowering the liquidation price on a leveraged GMXposition by adding Atlantic puts to one's position.

Back in August, Dopex launched their first product built around the idea of Atlantics, **Straddles**. These are fairly popular options strategies that traditionally involve longing an at-the-money (ATM) call and put. The combination creates an inverted triangular payoff chart and earns money when the price moves significantly in either direction. It is a perfect instrument for traders who anticipate volatility but are not sure in what direction. In case the price does not move, the buyers lose the premium paid for the option. Straddles give investors the option to bet on both the upside and the downside of the underlying.



Payoff graph of an Atlantic Straddle

The straddles in Dopex's case do not consist of ATM call and put, but are built around the novelties of Atlantic options.



Atlantics Straddles mechanics

The options writer is short $1 \times$ Atlantic Put, whereas the buyers is long $1 \times$ Atlantic Put. The writer deposits $USDC$ as collateral to the contract and buyers can come in to purchase straddles for a premium and pay a funding fee of 36% to borrow half of the collateral and buy spot ETH.

As said earlier, buyers win on high volatility and their max loss is the premium paid for the option. Writers, on the other hand, are exposed to short puts and are at risk of losing their collateral if not properly hedged to the downside and in return they earn high yield. The Dopex Straddles project returns of $350\% - 500\%$ APY varying from underlying assets. As of writing, straddle options are available for ETH, DPX, and $rDPX$.

We have included Dopex again in this paper because writers are able to roll over their position between epochs. The yield is automatically compounded back into the position. This is a handy feature for traders who want to earn some risky yield on their stables, but do not want to perform active management. Straddles earn significant returns but bear a certain downside risk. Community rumors report that the Dopex team will come out with hedged straddles for writers and we expect that this will greatly improve the use and liquidity of this type of options.

Pros	Cons
Novel way of profiting off of crypto's high implied volatility.	Very limited use cases - available only for three assets.
Strategy returns are very competitive.	European style options, they cannot be exercised at any given moment.
	Significant downside risk for writers without hedging properly.

Key takeaways

$DOVs$ strategies obtain yields from the payment of option premiums providing investors with a stable and sustainable yield in both bull and bear market settings. Prior to the creation of $DOVs$, option strategies were only available to accredited investors through over-the-counter trading or by self-execution on options exchanges. This type of vault takes away all the complexity and management from the investor by either being automated or manually managed.

Management

Automated DeFi Option Vaults program all activities upfront through the use of smart contract triggering. Smart contracts themselves cannot be automated as their code will not run and make state changes on a blockchain until triggered by an on-chain transaction. In some use cases, end-users call on-chain functions directly through their own smart contract interactions.
This is where keepers, which are externally owned accounts (*EOAs*), come in. They are incentivized to trigger the execution of smart contracts based on predefined conditions and this benefits the DOV industry. The most used keepers as of writing are $Keep3r\ network$, $Gelato$ and $Chainlink\ automation$.

Managed DeFi Option Vaults typically involve running a Solidity cron job on a centralized server or having a development team manually monitor conditions and make on-chain transactions. In such setups, the node becomes a centralized point of failure that introduces risk around the untimely execution of the smart contract function. Smart contracts that don't execute when required can lead to asymmetrical exploits and missed opportunities.Additionally, manual developer operations (*DevOps*) also place demands on projects' time and resources, which could otherwise go to core product development and ecosystem expansion.

Fees

Protocols that provide such service to their user base should and do charge a fee. The fee structure can comprehend:

a) A deposit fee. This type of see is seeing less and less implementation as users demand a flexible capital movement;
b) A withdrawal fee. This is usually charged to detain liquidity "vampires" exiting and re-entering the vaults on a short-time basis. A different approach is to charge a fee equal to the size of the profit in case a user withdraws before a certain epoch;
c) An asset under management fee. This fee is often charged on an annual basis;
d) A performance fee. This is usually charged only if the vault is profitable and should not exceed one-fifth of the profits.

While usually options are a tool used only by experienced investors, $DOVs$ lay down the barriers of entry democratizing access to an important tool.

Product Offering

The future for DeFi Option Vaults looks promising as at the moment the products are very immature offering only vanilla puts and calls strategies. The offering can and will become increasingly complex with more sophisticated option structures that better utilize the collateral and amplify the base yield. A whole world of money lego can be opened up by tokenizing the option strategy contracts and allowing for trade in secondary markets.

DOV Drawbacks

$DOVs$ have the potential of revolutionizing the options landscape but they also have potential drawbacks.
First of all, the systematic selling of volatility could have overcrowding of market participants running the same volatility selling strategy, especially when volatility eventually mean-reverses aggressively higher after an extended period of low volatility.

Another issue of $DOVs$ is the possible front-running of users in regard to the automated strategy execution. This is a problem because like all assets, option prices are determined by demand and supply. Currently, most auctions are held on Fridays as *MMs* can offload risk going into the weekend. This makes it predictable for volatility traders to front-run the $DOVs$ auctions. Since auction information is made publicly available, volatility sellers across short-term tenors can profit from short-selling volatility ahead of these auctions and close out their positions shortly after the auction happens.

Most option vaults require over-collateralization. This requirement is intended to prevent naked selling and to protect investors from losing more than they own. However, enhanced security may come at the cost of lower returns. Improvements to this issue are being thought of with the goal of addressing the capital inefficiency issue. $Ribbon\ Finance$, for example, is considering lowering the collateral requirements for the option vaults and has already integrated with $Lido\ Finance$'s liquid staking, allowing vault depositors to earn both staking rewards and premiums on writing calls. $StakeDAO$'s option vaults are also introducing an extra step in the process by depositing underlying assets into another yield-earning strategy before writing the options to be sold.

One of the main criticisms towards DOV protocols is that they are mainly used by market makers that use retail deposits to hedge their positions elsewhere. Normally the DOV auction bidders are professional Market Makers, OTC desks and hedge funds who have significant modeling sophistication, balance sheet and proprietary technology to manage risk.

The hedging and market making is often done between $DOVs$ and the crypto options exchange $Deribit$. In a lot of the cases, the auctions of DOV options occur on Friday coinciding with $Deribit$ expiries. Friday is the best date for market makers to hedge and during these auctions have to outbid each other. This leads to a sell-off of volatility and results in the DOV depositors getting hurt. According to $Paradigm$'s research, retail loses around 5.35% in APY due to the auctions happening on Friday. The firm recommends the space to scatter the auctions of options by DOV protocols across other weekdays smoothing out the market impact. This is in line with $Friktion$'s research on the topic, where they used their data for backtesting and concluded that moving the auctions 6 $hours$ earlier would help the protocol take advantage of higher implied volatilities.

Another issue with some projects is the centralization of their options auctions. The lack of transparency could indicate that a select few entities are able to scoop up cheap options at the cost of the depositors and make profitable hedges on Deribit. This hurts retail depositors in the DOV vaults, but also walls off other entities from participating in the bidding to create a fairer and more competitive environment. $Ribbon$ and $Friktion$ are two great examples that host their options auctions in a transparent manner on-chain using $Gnosis$ or $Channel\ RFQ$. On the other hand, $JonesDAO$ builds on top of $Dopex\ SSOVs$ which are also on-chain and thus offer transparency.

Conclusion

DeFi Option Vaults are a great example of structured spin-offs that make a complex product, options, more accessible to retail investors. Traditionally, options strategies would be gated from retail due to high capital entry barriers or require deep understanding of mechanics, greeks, and high management time. One of the beauties of DeFi is that smart contracts and protocols take away the complexity and in the case of options, they have made advanced strategies really available to the public.

This paper acts as a short overview of DOV projects on certain, key characteristics. We wanted to emphasize the importance of transparent auctions and auction timings, as laid out in the articles by $Friktion$ and $Paradigm$. These two factors are of important value for the performance of the vaults and the alignment with the open-source and transparent ethos of DeFi.

From our research, we have gathered that $JonesDAO$ is an interesting new contender that conducts centralized managed options strategies using $Dopex$ options platform. They have plans of moving to a more decentralized model in the future and have recently rolled out LP vault products. These vaults allow users to deposit LP tokens and yield is used to buy call or put options, depending on the vault direction, to enhance generated yield.

$Ribbon$ is, as of writing, by far the largest DOV protocol in terms of usage and TVL. The team is working on expanding their product suite and recently have added $Ribbon\ Lend$, an undercollateralized lending market focused on institutions. Important to note is that the protocol has moved their options auctions to $Gnosis$ to create and support transparency in their processes.

We also discussed $Opyn$'s *Squeeth*, $Cega$'s *Fixed Coupon Notes*, and $Dopex$'s *Straddles*, because we believe these products are interesting additions to the topic of $DOVs$. All three products have a unique design and are built around the options market. They definitely offer traders' portfolios more customization and flexibility.

Over the past year, the DeFi Options Market has grown significantly in terms of the amount of projects building option products, but also in terms of TVL and liquidity. We expect that this trend will continue to grow and we expect to see more innovative options products to be built. Two examples of interesting upcoming projects are $Y2K\ Finance$ and $Rysk\ Finance$. The former is building depeg insurance options for pegged crypto tokens, while the latter is creating a new options AMM model.