

Grey Swan Finance

On-chain Options - A Case Study

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Abstract

Grey Swan Finance is building financial infrastructure for the benefit of Decentralised Autonomous Organisations (DAOs) treasuries and layer 1 & 2 foundations. With their digital assets being highly volatile, it is difficult for them to meet their growing liabilities in *fiat* terms. Leveraging established derivatives strategies, Grey Swan effectively hedges the risk inherent in crypto markets so that institutions can protect their capital base and achieve stable and sustainable cash flows. By de-risking the treasury, developers can focus on what they do best – *build*.

1 Introduction

In the last two years, the increased interest in Decentralised Finance (DeFi) has seen the Dollar value of the treasuries of many DAOs skyrocket. As of 24 May 2022, over 60 DAOs have a treasury whose Dollar value is in excess of \$10M Assets Under Management (AUM), 16 treasuries even exceed \$100M [1]. The treasury is of highest operational importance to any DAO because it is the single source of funds the DAO has at its disposal to meet all of its expenses: from paying core contributors and contractors, to funding grants to spur ecosystem growth, to financing M&A activity.

Crucially however, while a typical DAO treasury is comprised of its native token and some blue chip coins such as BTC or ETH, many of its expenses such as payments to developers are (at least partially) denominated in *Fiat*. Suddenly

worsening crypto prices as experienced most recently in the aftermath of the LUNA-UST debacle [2] then forces the DAO to liquidate its tokens, and possibly downsize its team, in order to meet their Dollar cash demands in the short to medium run. This is problematic in a couple of ways: Firstly, a DAO sells large amounts of its capital base (potentially) at the bottom, giving away its assets at cheap prices to experienced whales who amass critical voting power. Secondly, when markets have stabilized, DAOs have a much smaller capital base, forcing them to cut back spending, limiting their growth potential. Finally, a DAO selling its treasury in a falling market creates a negative signalling effect to many retail investors [3]. To many it gives the impression that the DAO is either not doing well or worse, rug-pulling in front of everybody's eyes. Also, selling larger and larger quantities of their token creates a large market impact and likely a downward spiral for the coin.

Fortunately, there are established techniques from traditional finance where analogous risks are experienced and managed by businesses operating in international markets. Treasury departments buy futures and options on the capital markets in order to hedge their company's foreign exchange and interest rate risks [4]. This enables business managers to plan ahead efficiently without being worried about adverse market movements.

A similar strategy can now also be employed in the digital asset space where the crypto derivatives market has matured a lot in recent years [5]. In particular, as of late May

2022, there are large and highly liquid (perpetual) spot and futures markets and while option Decentralised Exchanges (DEXs) have yet to pick up steam, with *Deribit* there is an institution-grade off-chain options market. The Centralised Exchange (CEX) ethereum options market saw a growth of 662% in 2021-22 in terms of aggregate monthly volumes, and the open interest surpassed 7B USD. Moreover, there is also a large over-the-counter (OTC) market where market participants trade bilaterally rather than through an exchange. This allows to access deep liquidity for many other tokens besides ETH and BTC with little slippage for large block trades as is often needed by DAOs.

2 Primer on Derivatives

Derivatives offer capital efficient routes to leverage trading and structuring positions within markets. This is partly due to the fact that neither parties need to trade the underlying asset. We briefly examine the structure and properties of options and futures, for a more detailed discussion see [6].

2.1 Futures

A future is a contract to buy or sell the *underlying asset* at a future date - the expiry date - and at a fixed price. The parties are obliged to settle the contract, either in cash or *physically* with the underlying asset. It does not cost to enter into a futures contract.

2.2 European options

A European option contract provides the buyer with the right *but not the obligation* to buy or sell the underlying asset at a given *strike price* at a pre-defined expiry time. The right to sell is referred to as a *put* option and the right to buy as a *call* option, cf. Figure 1. As there is no downside risk for an option buyer, they need to pay a premium to the seller. If the option expires in-the-money (ITM), the option is exercised. If it expires out-of-the-money (OTM), the buyer will forego his right to exercise. As collateral against the contract, the seller of the option must post increasing amounts of margin (collateral) as the contract moves further ITM.

2.3 Comparison

Perpetual futures have gained popularity with retail investors as a great way to trade with leverage in the market - both on CEXs and DEXs. We believe that DAO treasuries can benefit largely by using dated futures and European options. In particular, the latter can be used to limit downside without sacrificing potential upside, which is extremely desirable given the growth curve of DAO treasuries.

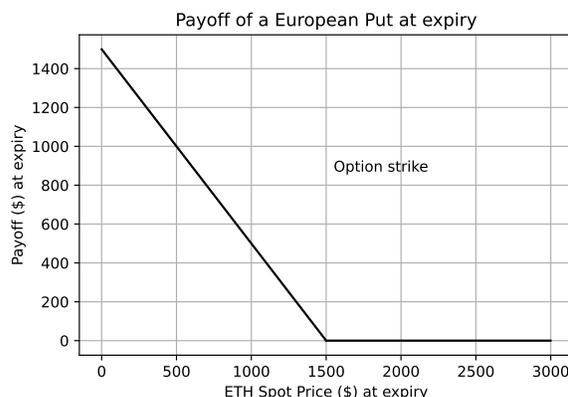


Figure 1. As a *put* option buyer struck at \$1500, one has the right *but not the obligation* to sell the underlying at the agreed strike price. Therefore, if at expiry the spot price exceeds \$1500, the option is not exercised. However, if spot lies below the strike, the option is exercised and the buyer receives the difference between spot and strike.

3 How Grey Swan can help

Let's take look at a few common problems a DAO treasury might face and examine how the use of derivatives can effectively hedge the risk and remove any worries about falling crypto prices.

3.1 Hedging salaries and other expenses

A DAO will typically hold the majority of its assets as a combination of its native token und blue chips such as ETH or BTC. On the other hand, with growing teams, many DAOs are facing a growing amount of regular expenses denominated in *Fiat* (e.g. USD), for example to pay salaries to core contributors and contractors or to pay for infrastructure and other services. Rather than selling valuable tokens in advance on the Spot market and thereby forgoing any potential gains from rising crypto prices, it makes more sense to buy options, i.e. in this case *European Puts*, as downward protection / insurance.

3.1.1 Case study. Let's say a DAO needs to meet \$100k expenses in a months time. With a current ETH spot price of around \$2000, a DAO could decide to sell 50 ETH now to have \$100k cash in USD stable coins. The drawback of this approach is that this sacrifices any potential upside of ETH in that period. On the flip-side, the DAO could wait until the end of the month to convert to stable coin. This approach leaves the treasury exposed to severe swings - for example, if the price of ETH fell by 50% to 1000 USD, the treasury were forced to sell double the amount of ETH (a total of 100 ETH) to pay the expenses, as shown in Figure 2. To defend the DAO's objective to protect its capital base denominated in ETH, a DAO can hedge their expenses by

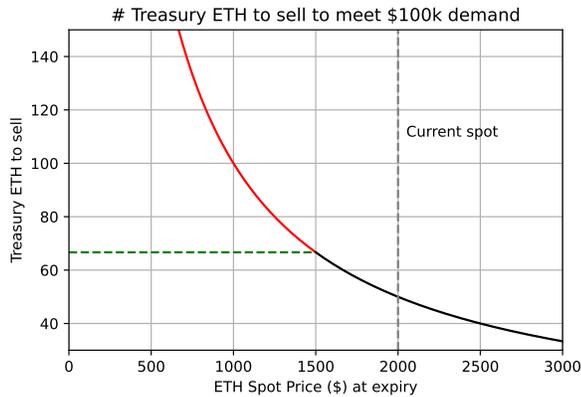


Figure 2. Number of treasury ETH to sell to meet \$100k demand in expenses as a function of ETH Dollar Spot price. Dashed green line shows scenario with insurance cover, solid red shows unhedged position.

purchasing a number of *European put* options, say with a 1 month maturity date and struck at 1500 USD. With a current implied volatility of ETH of 100, one put option at today's market prices (27 May 22) costs a mere \$50 per ETH, so the required 67 European puts struck at \$1500 (to arrive at \$100k) give a total insurance premium of only \$3.3k in total. With this protection, if ETH were indeed to crash to \$1000, the DAO would only have to sell 67 rather than 100 ETH, while still profiting fully from any potential upside, see also the visualization in Figure 2. Here, the green dashed line shows the hedged scenario and the solid red line shows the unhedged scenario.

3.2 Preserving the \$ value of the capital base

While a fraction of their treasuries might be in stables, the majority of the assets will always be in non-stables and therefore be subject to wild swings and sharp downturns. Besides the mentioned regular expenses, there is also a long list of other non-regular expenses such as development grants, security audits, lawyer fees, event sponsorships etc. that need to be paid out of the treasury. It is therefore critical that the capital base is not depleted in a sudden downturn of the market. Rather than accepting sudden downturns as a fact of being in this market, it is advisable to (partially) hedge the capital base with downside protection puts, cf. Figure 3.

3.3 Treasury portfolio optimization and reallocation

To limit the exposure of the treasury to a single asset, it is an established risk management strategy in both traditional as well as decentralized finance to use *diversification*. That is, to construct a weighted portfolio of a range of assets with the aim to reduce volatility of the treasury. Moreover, there is a great amount of literature and experience in optimizing portfolios to achieve the best risk-adjusted returns [7].

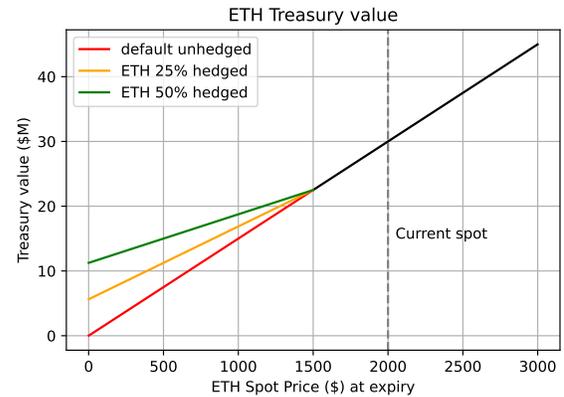


Figure 3. Effect of (partially) hedging the downside risk of a treasury consisting purely of 15000 ETH. Here a large number of OTM puts struck at \$1500 are used as protection to dampen the effect of a large downturn of the market.

When reallocating large amounts of assets, trading fees and market impact / slippage play a larger and larger role and sophisticated *optimal execution algorithms* [8] are needed to rebalance the portfolio in a cost effective manner.

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