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# Concentrated liquidity in Uniswap V3: A new strategy to optimize the capital bear market

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# Concentrated liquidity in Uniswap V3: A new strategy to optimize the capital bear market


## Abstract

This article aims to offer a new vision on concentrated liquidity in Uniswap V3 and how we can effectively optimize liquidity thanks to the new tools provided by the DeFi ecosystem. Since the concept of concentrated liquidity first appeared in 2021 with Uniswap V3, new tools have been emerging to improve the security of smart contracts and offer better incentives to liquidity providers. This paper aims to propose a liquidity strategy concentrated in DeFi in order to draw additional liquidity in times of quantitative tightening and high interest rates, while trying to optimize the choice of the range to mitigate the non-permanent loss effect as long as our position is open.



## Keywords

Bitcoin, crypto-economy, stock markets, Uniswap, DeFi

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A12, B22, E31

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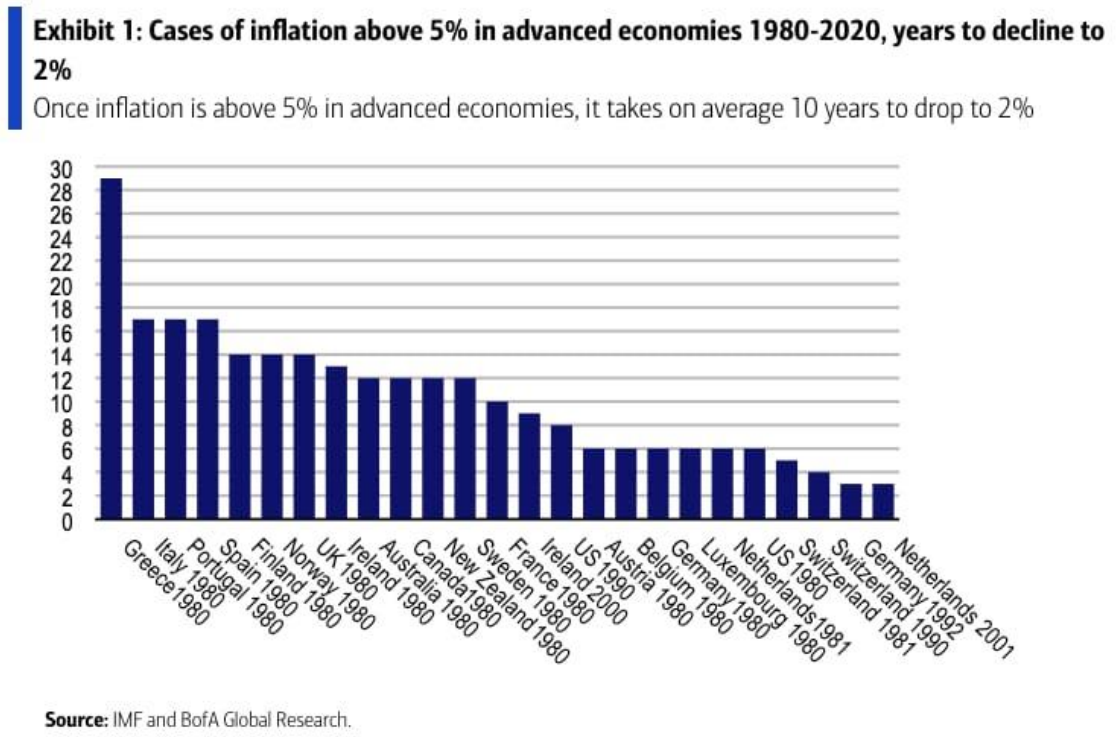
## 1. Introduction

The years 2022 and 2023 will go down in history as one of the moments of the greatest tightening of central banks' restrictive policies, better known as quantitative tightening (QT). Since January of 2022, the US Federal Reserve has raised interest rates from 0 to almost 5.50%, something not seen in such a short period of time since the inflationary crisis of the 1980s. This kind of macroeconomic situation poses problems in terms of liquidity for the market. This paper aims to propose a liquidity strategy concentrated in Decentralized Finance (DeFi) in order to draw additional liquidity in times of quantitative tightening, while trying to optimize the choice of the range to mitigate the non-permanent loss effect as long as our position is open.

Through 2022, inflation has reached over 10% in many developed countries and central banks have no choice but to raise interest rates aggressively to collect some of the money in circulation. However, the outlook for the next few years is not very encouraging, as bringing inflation back down to 2% could take as long as a decade, as can be seen in the graph below:

Figure 1: Cases of inflation above 5% in advanced economies




For example, the main objectives of the U.S. Federal Reserve (FED) are to maintain price stability, promote employment and moderate long-term interest rates. However, by the third semester of 2023, interest rates are 5.5%, which means that stock markets have undergone a deep correction and that the economy is entering a severe recession. Nevertheless, crises are often the perfect time to reflect on mistakes and look for improvements for the future. In the midst of this somewhat discouraging outlook, the decentralized finance sector is growing steadily and is bringing a unique democratization of finance in history. In particular, the concept

of concentrated liquidity, which was born in 2021 with the arrival of Uniswap V3, allows users to optimize their capital to the maximum with a win-win formula that in principle benefits all players. Of course, it can be an opportunity to build liquidity against the backdrop of the economic recession mentioned above. However, often liquidity providers face the extreme volatility that characterizes the crypto market and their position gets out of range, either up or down, so they have to take an non-permanent loss (NL) and make the difficult decision of when and how to unwind the position.

Arguments of this nature led to an interest in the possibility of designing a new strategy in the DeFi ecosystem that builds on the advances of blockchain technology and concentrated liquidity's tools that will be analyzed in this paper.

## 2. How decentralized finance and the Uniswap market work

DeFi is closely related to the blockchain ecosystem and the crypto-economy. In others words, we can view DeFi as a revolution in the traditional financial system, where there is a transformation towards decentralized structures based on smart contracts.

DeFi offers three main benefits, namely: (a) greater transparency, (b) an unalterable record of transactions, and (c) the elimination of trusted third parties. Although Bitcoin is arguably the world's first DeFi platform, we can trace its origins back to 1994, when Nick Szabo presented for the first time the idea of smart contracts (Gans 2019). The arrival of DeFi and its increasing adoption across the globe decreases the benefits of traditional banks and large financial institutions, making them largely obsolete. The reason for this is that the technology allows individuals to create financial products that are fair and transparent. As a result, individuals can provide liquidity to a decentralized exchange and each participant in this market can apply for a loan using a crypto as collateral.

Furthermore, due to the advances in this decentralized finance, it is possible to borrow or apply for financial services using a mobile application without the bank as an intermediary. This trend can be viewed as a transformation towards a new type of economy that is characterized as a decentralized, efficient and more competitive system. This transformation is different from FinTech, where the traditional financial system saw an opportunity after the 2008 crisis to create digital finance that is fast, efficient and inexpensive, thus reaching clients on a large scale. In contrast to FinTech, DeFi uses decentralized blockchains, thus eliminating intermediaries and the bureaucratic procedures behind the traditional banking system, while offering loans through tokenized debt. It also allows P2P money transfers through non-custodial wallets, such as Metamask, and markets move on decentralized exchanges (DEX).

As for Uniswap, it is a decentralized automated liquidity protocol (Automatic Market Maker). It was created in August 2018 by Hayden Adams and launched in November 2018 after receiving $100 million in funding from the Ethereum Foundation. Its native UNI token is primarily used for governance and grants voting rights to holders. In contrast to centralized exchanges, such as Binance, Kraken or Coinbase, Uniswap is a smart contract, allowing users to buy and sell tokens without the need for a third party; such decentralization is achieved through programmable escrows (Hashed Timelock Contracts) which in the computational realm are called atomic swaps

(Mad 2021). These DEXs like Uniswap are considered AMMs (Automated Market Makers), as they allow trading without the need for a trusted third party. They are created by liquidity providers depositing assets in a fixed ratio, establishing an initial distribution of beliefs about potential outcomes. These AMMs employ a scoring rule that calculates the cost of changing the distribution of beliefs from the current state to a desired state. This rule incentivizes traders to report their true beliefs, ensuring a positive expected value for distribution adjustments. Importantly, the state of the exchange relies solely on the total deposited quantity, leading to reduced storage requirements compared to traditional exchanges. Moreover, pricing a trade within AMMs requires only a single function evaluation, simplifying the process compared to complex matching algorithms like order books. Furthermore, AMMs do not use an order book to trade and work thanks to liquidity pools, where users can contribute liquidity to the platform, receiving in return a commission every time a trader makes use of it. A liquidity pool is always composed of two tokens, for example, ETH/USDC, and the liquidity provider has to contribute the two tokens in the same proportion: in the ETH/USDC pair, if 1 ETH trades at $1,500, the LP will be 1ETH/1,500USDC. So, imagine that ETH is represented by *x* and USDC by *y*; the protocol multiplies them against each other and obtains a total liquidity pool represented by *k*, so the final formula would be *x*y=k*. Here, it is essential that the function of *k* remains constant at all times. This means that if a user decides to buy 0.5 ETH for 750 USDC using that liquidity pool, USDC in the reserve will increase and ETH will decrease, so the price of Ethereum will go up. In addition, the market itself is in charge of ensuring that prices do not get out of control, since if the price of an asset is higher in one exchange with respect to another, arbitrage opportunities are generated that rebalance the price. As Guillermo Angeris, Hsien-Tang Kao, Rei Chiang, Charlie Noyes, and Tarun Chitra point out in the article "An analysis of Uniswap Markets", the cost of manipulating the price of a constant product market scales linearly with the reserve amounts, emphasizing the significance of maintaining substantial reserve pools. This means that the relative return for Uniswap is linked to the relative ratios of reserves, and the total portfolio value is influenced by these ratios.

In addition, the mechanism described above determines prices without the need to have an order book that is required for centralized exchanges. It allows for automation of processes and decentralization. However, nowadays we have two main issues related to this system:

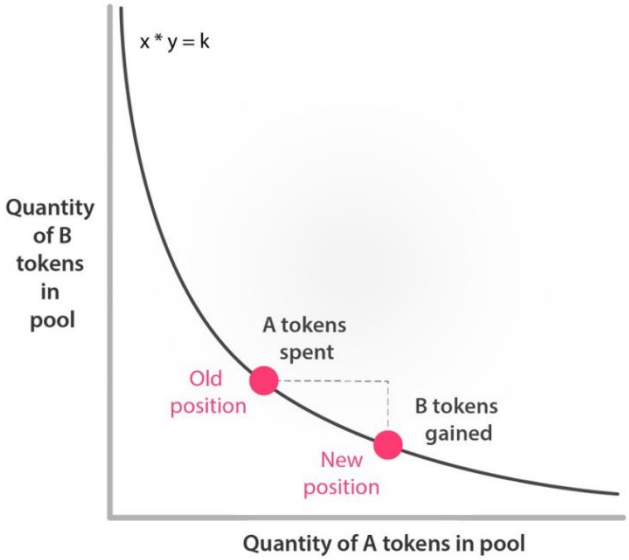
1. In this DeFi model, users are lending their liquidity to protocols and can withdraw it at any time to move it to new protocols that offer better returns in terms of APR and APY. This constant migration creates a lot of instability and manipulation by the "whales",[1] causing many protocols to fail and die by suddenly running out of their best asset: liquidity.
2. The price of an asset is usually traded within a certain price range. By providing liquidity across the entire price curve, capital is not optimized and fees are much lower. In other words, a huge amount of money is needed for the fees to compensate in some way for the risks associated with decentralized finance (hacking of a smart contract, impermanent loss, etc.).

[1] Users with lots of cash.

To address these problems, we will focus on a win-win solution consistent with game theory (Nash 1996), and which allows for maximum capital optimization using concentrated liquidity, which was implemented in May 2021 with the arrival of V3 of Uniswap. Liquidity providers can now customize a range on the price curve, which will no longer range from 0 to infinity and would therefore help to concentrate liquidity in the price range with the most activity. This means that the liquidity provider is bound to professionalize and keep up with exchange activity if it wants to improve its profits. In addition, its position in Uniswap will now be unique and will become represented by a non-fungible token (NFT).

This new version allows the capital provided by liquidity providers to be greatly optimized and rewards those who know how to find the right range at the most suitable moment in the market, as can be seen in the following graph:

Figure 2: How concentrated liquidity works




To exemplify this concept, let's imagine the following scenario with the price of 1ETH = $2,000:

Investor A deposits $5,000 of liquidity in the ETH/USDC pool, choosing a price range from $1,500 to $3,000. Investor B deposits $3,000 in a tighter range of $1,500 to $2,500. Finally, investor C deposits $2,000 in an even tighter range of $1,800 to $2,200. Thus, the available liquidity for the ETH/USDC pair will be the combination of all these individual price curves. It is clear that investor C has concentrated its liquidity the most. If the price stays in that range, they will receive more commissions despite having contributed less capital.

It should be noted that Uniswap initially worked only on Ethereum, while now it can also be used with Polygon, Optimism and Arbitrum, which are basically layer 2 solutions whose main purpose is to improve Ethereum's scalability. The ability to operate with layer 2 protocols marks

a before and after. Firstly, the network commissions (gas fee) are much lower, so it pays to operate even with a smaller capital.

Secondly, despite the fact that the TVL (Total Value Locked) in Ethereum is much higher, in Polygon, Optimism and Arbitrum there are fewer liquidity providers[2], so the commissions received are similar, and that is not counting the significant savings with network commissions.

However, there is a question that arises spontaneously and is very pertinent: what happens if we go out of range? The answer is that if we get out of the downward range, for example with MATIC-USDC, the protocol will sell all of our USDC and we will be left with a 100% position in MATIC until the price re-enters the range. Conversely, if we exit upwards, the position will be 100% in USDC.

Do not forget that the chosen range is like an NFT. It cannot be modified, and the only option to change it is to remove the liquidity and recreate a new position. In a bearish or sideways market, if we think that the price of MATIC is going to go up in the future, there is nothing wrong with going out of the range downwards, as it is a way of doing DCA (Dollar Cost Averaging) and accumulating MATIC. We can also wait until the price re-enters the range.

On the other hand, if the MATIC price rises with respect to our entry point, it may be in our interest to close the position, since not only will we have earned the range commissions, but the dollar market value of our pool will have increased. This is obviously assuming that we are in a bear or sideways market, not in a Bull run.

To elaborate on this possibility, the following research questions have been formulated:

1. What strategy can be used to provide concentrated liquidity in Uniswap in view of the macroeconomic situation?
2. How could one choose the best pairs and optimize the choice of the range to mitigate the impermanent loss effect?

To address these questions, the following sections will elaborate on out-of-range Impermanent Loss, relating it to the theoretical framework with the objective of designing an innovative proposal, the aim of which is to use the latest tools available in 2023 to maximize the return on the capital provided by the liquidity provider.

## 3. Fluctuation of the price and out of range impermanent loss

Before opening a concentrated liquidity position in Uniswap V3, it is crucial to understand what happens when the price fluctuates out of range and how it can affect liquidity providers. Impermanent Loss (IL) is quantified and defined as the disparity between the HODL performance of contributed assets and the performance of the corresponding Automated Market Maker (AMM) portfolio. In a traditional AMM (V2), assets are consistently contributed in equal value, which implies that the HODL value of a portfolio concerning the numeraire asset is directly proportional to 1 + $x$. Here, '1' represents one unit of the numeraire asset, and 'x' denotes one unit of the risk asset, with the exchange ratio 'x' normalized to $x(t = 0) = 1$. To compute IL

[2] March 2023

effectively, it is most straightforward to anchor our perspective to the numeraire of one of the assets, such as USDC in the context of an MATIC-USDC pool. We introduce the variable $x$, representing the exchange ratio between the two assets, denoting the relationship between their prices. In the case of MATIC-USDC, with USDC as the numeraire, $x$ essentially signifies the price of MATIC expressed in USDC. We also normalize $x$ to $x$ = 1, which technically signifies the change in the price ratio, to be precise. In this scenario, the value of the HODL portfolio investing 1 unit of the numeraire in each asset can be mathematically represented as:

$$HODL(x) = 1 + x$$

To maintain precision, it is important to note that these numerical values are dimensionless and need to be scaled by the initial portfolio notional.

As a well-established result, the value of the AMM portfolio in this context is calculated as:

$$AMM(x) = 2\sqrt{x}$$

This calculation informs us about the Impermanent Loss (IL) as:

$$IL = 2(x - \sqrt{x} - 1) / 2\sqrt{x}$$

As previously discussed, this value lacks dimension and represents a percentage applied to the original portfolio notional.

For Uniswap V3, there is a need to adjust this formula as our reference portfolio now comprises $N(x)$ units of the numeraire asset and $N(x)$ units of the risk asset, with an appropriate normalization choice for 'n'. It is also important to consider that liquidity providers can add or remove liquidity over time, generally leading to changes in asset composition ($x(t) \neq x(0)$). To address this, we treat each addition or removal of liquidity as a replacement of the position. In essence, we assume that every liquidity's change results in the closure of the entire position, followed by the opening of a new position corresponding to the post-liquidity holdings. Furthermore, for IL calculation purposes, we assume that all open positions are closed out at the calculation point.

In other words, Impermanent Loss within a concentrated liquidity framework, then called *out-of-range IL*, is a multifaceted concept. It necessitates addressing the introduced leverage while also accounting for IL scenarios beyond the specified range, a factor absent in traditional Automated Market Makers (V2).

For example, let us consider a scenario where the initial exchange ratio $x$ is 1000, and we impose a cease in trading if $x$ falls beyond the 800-1200 range. Below 800 (reflecting a 20% decline), and beyond 120, the AMM ceases trading, and the portfolio composition remains unchanged (while the value remains dynamic) in response to price fluctuations. When viewed through the lens of traditional AMMs (V2), this confines our IL to roughly 0.5%. However, a positional incongruity arises, which we shall delve into further below. This incongruity represents the primary challenge in formulating a meaningful and intuitive IL metric for range

800-1200 AMMs. The essence of this challenge lies in the disparity between our observed IL within the 800-1200 range, well below 0.6%, and the uncertainties outside this range.

In other words, the AMM becomes more exposed to the risk asset than our HODL portfolio (where the AMM buys low and sells high). Consequently, it faces greater losses if the risk asset's value declines further. Out-of-range IL arises when the asset strays beyond the range. It represents the difference in performance between the initial HODL position and the frozen position at the range's end, where the underperforming asset is overweighted. Out-of-range IL can be avoided without fee loss by withdrawing the position after it goes out of range and rebalancing the portfolio to its initial HODL composition or any other preferred directional position by the liquidity provider.

In essence, the complex nature of IL in a concentrated liquidity framework requires a nuanced approach, which ensures a comprehensive assessment of LPs' performance on Uniswap v3.

Regarding the opening of the range, and as a result of the macroeconomic analysis we did in the theoretical framework, we can state that the best time to open a concentrated liquidity position is when the FED starts to raise interest rates, because at those times investors will take their money out of the most speculative assets and we will be able to find cryptocurrencies at a very good price. This aspect is closely related to the opening of a concentrated liquidity position in Uniswap V3. Although we have seen that the out-of-range IL affects us whether we exit below or beyond the range, our objective during a bear market is to increase our dollars reserve. That means that it will be in our best interest to stay inside the position and then exit above it. In the MATIC-USDC example, if we exit beyond the range it will mean that our entire position will be in USDC and we no longer care that the price of MATIC continues to rise as we will have more USDC than when we opened the position. On the contrary, we must avoid that the price of MATIC goes below the range, because in that case we will have 100% of our capital in MATIC and we should unwind the position and move our capital to USDC in order to minimize losses. In the next section we will see which tools we can use to open a concentrated liquidity position in Uniswap V3 and how we can correctly choose the range.

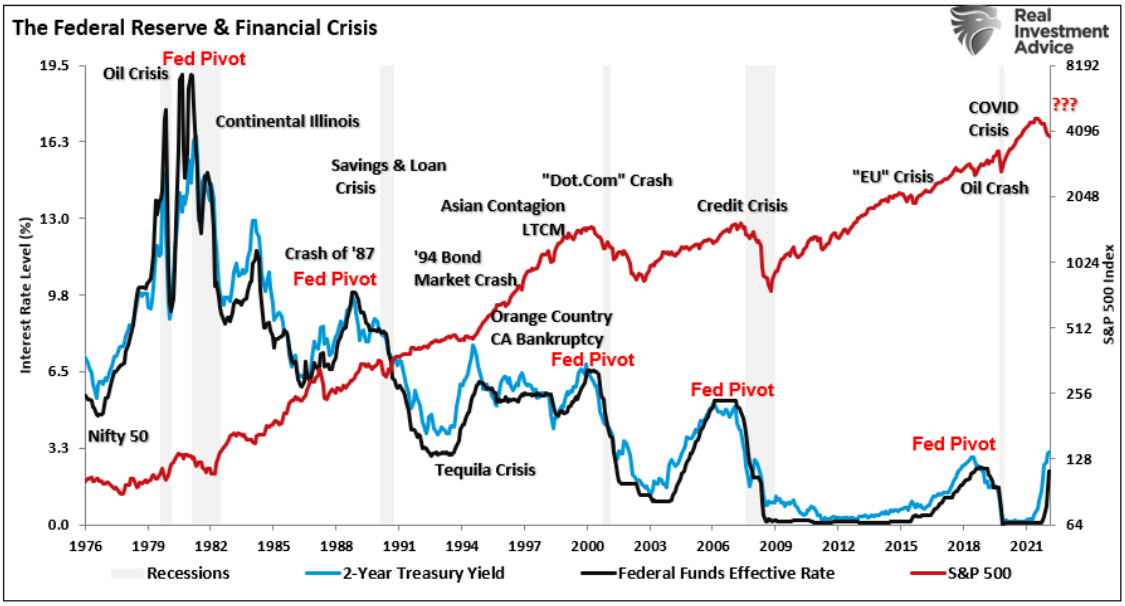
## 4. New strategy and tools to open a concentrated liquidity position

A liquidity position is a combination of the effective liquidity and the time spent in-the-money. Liquidity providers collect fees based on trading volume, the fee tier, total liquidity at the trader tick, the LP position’s liquidity, and the fraction of time spent inside the upper/lower risks. Therefore, deploying liquidity in Uniswap V3 is more capital-efficient than in Uniswap V2, allowing LP to deploy concentrated liquidity between any two “price ticks”. Of course, the effective liquidity of the position is much larger for narrow ranges. In addition, the study of Lambert found that LP returns for specific LP positions accumulate fees in proportion to the square root of the time the position is held. Therefore, LP positions will see diminishing returns over time, making it better to exit them early rather than holding onto them for an extended period. This seems to be the most significant finding of the analysis as it helps minimize liquidity

drag. Additionally, LP positions deployed to a single-tick have higher fees, but impermanent loss will be lower for tight ranges that are rebalanced frequently than for wider ranges.

Taking these aspects into account, a strategy has been designed to open concentrated liquidity positions in Uniswap V3 based on two factors: the macroeconomic situation and the choice of the currency pair according to the volume and time we plan to keep the position open. As already mentioned in the introduction, a correct reading of the macroeconomic situation is undoubtedly one of the pillars of this strategy as it determines our action as liquidity providers. As already discussed in the introduction, the US Federal Reserve during 2022 and 2023 carried out a very aggressive interest rate hike in only one year, taking them up to 5.50% by October 2023, something that had not happened since the 1980s and which represents an extraordinary measure to deal with inflation that approached very worrying levels of almost 10% by the end of 2021. It should also be noted that interest rates in the US were at 0% only in 2008 and 2020, respectively after the housing crisis and the Covid crisis. These data are fundamental to understanding the relevance of the Federal Reserve's monetary policy on stock markets. Typically, very low or near-zero interest rates coincide with aggressive periods of Quantitative Easing (QE), producing an artificial stimulus to the economy that is often a harbinger of crises to come. Many investors believe that when there is a pivot to higher interest rates, the market tends to react upwards. However, as we can see in the following chart, the opposite is historically often true:

Figure 3: Federal Reserve's Pivot and Bear Market (Lance Roberts, www.seekingalpha.com)

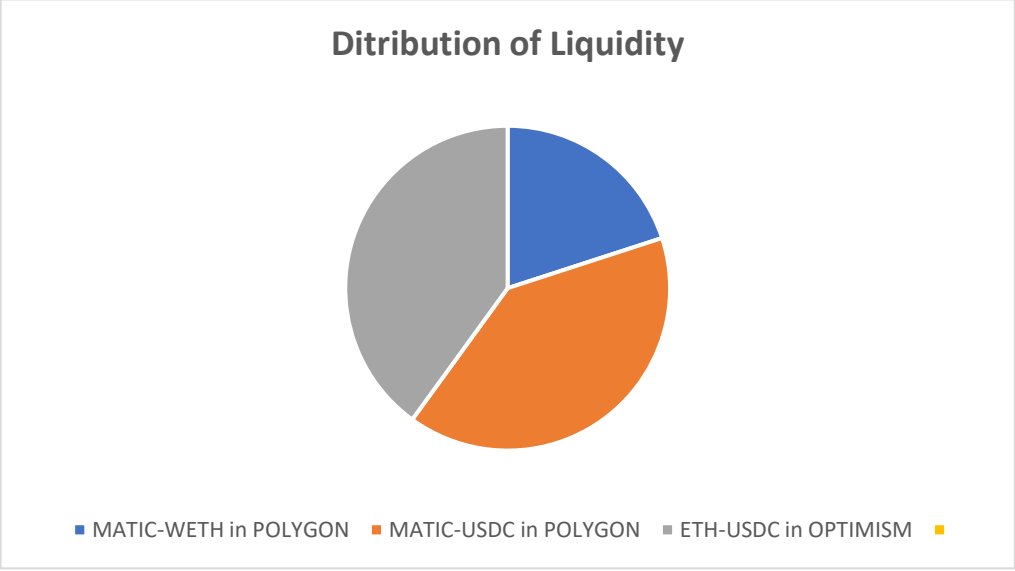



When there is a pause in interest rate hikes and a possible reversal, we are likely to see sharp falls in the markets. Why is that possible? We believe it is due to two fundamental factors: firstly, because it takes a few months for the interest rate hike to take effect; secondly, because the markets had already discounted this scenario in advance, assuming that the recession caused by the rate hike usually arrives with a certain delay; therefore, many investors take profits by taking advantage of any rebound that has occurred before the pivot. Taking into account this first

macroeconomic aspect, the decision to provide concentrated liquidity will be adjusted to these two specific moments: the start of the US interest rate hike and the Fed's pivot. In addition, at the beginning of the Quantitative Tightening period, the market usually reacts negatively, experiencing sharp declines, and the same happens when the pivot occurs. This period of time, from the first falls until the Fed's pivot, is the best time to provide concentrated liquidity by pairing stable currency with volatile currency. The purpose is to accumulate liquidity for when the pivot occurs and thus be able to buy at lower prices.

Regarding the choice of the type of currencies, the strategy proposed in this article contemplates only the choice of strong currencies with a large market capitalization and whose projects present solid fundamentals in the medium and long term. For this purpose, the ETH and MATIC currencies have been selected. When choosing the pair, we always look for three types of pairings: ETH-MATIC, ETH-STABLE and MATIC-STABLE. We are aware of the risk associated with stable coins, especially after what happened with Circle following the collapse of the Silicon Valley Bank in the US, and the idea of creating three pairings is intended to partly mitigate that risk, although it certainly does not eliminate it. As can be seen in the chart below, the distribution would be 20% pairing two volatile currencies (MATIC-WETH), 40% pairing MATIC-USDC on the Polygon network and 40% pairing ETH-USDT on either the Optimism network or the Arbitrum network, depending on where more fees are paid.

Figure 4: Distribution of Liquidity




We are aware of how the market is changing and we assume the arrival of new networks, as is the case of Arbitrum, or some changes in the volume of transactions, which could make us decide to migrate to another network or to change the pairing.

As for how to detect the volume of transactions, we have several tools that make our work easier. The first is undoubtedly Revert Finance, a yield optimizer that also provides us with valuable information on all the liquidity ranges concentrated in Uniswap. Thanks to Revert Finance, we can detect which have been the best ranges, as well as the APRs being paid in each one:

Figure 5: Concentrated Liquidity in Revert Finance

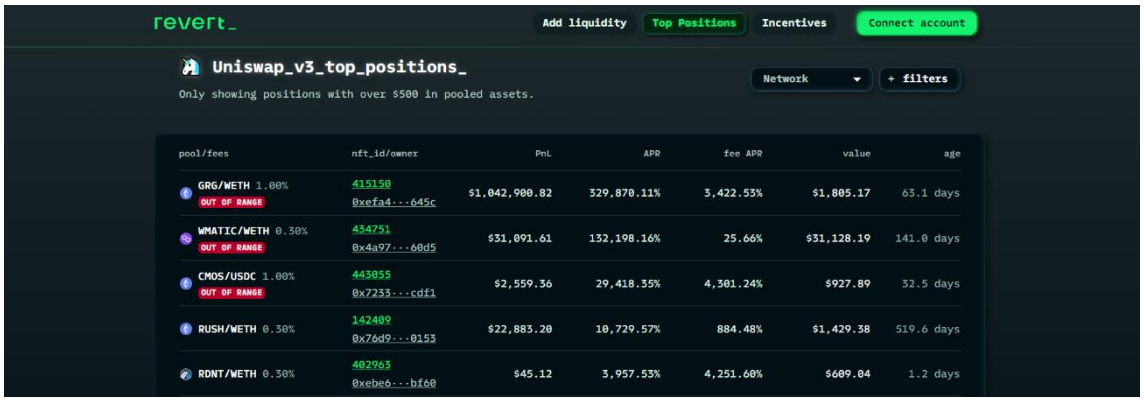
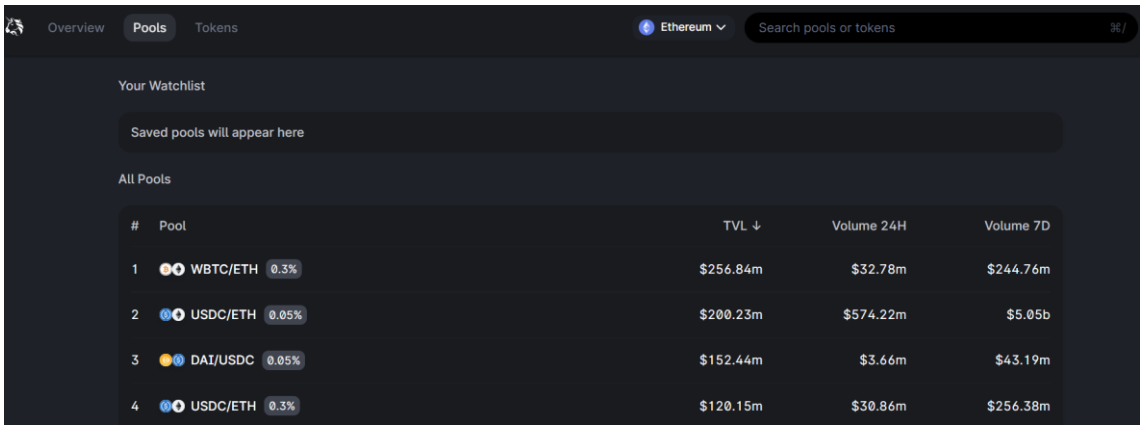



Figure 6: Detailed information in Revert Finance


Another complementary option is to look for the information on the currency pair directly in Uniswap, where the TVL (Total Value locked) is displayed:

Figure 6: Total Value Locked (TVL) in Uniswap




As can be seen in the image above, the WBTC/ETH and USDC/ETH pairs are the ones with the highest TVL, 256.84 and 200.23 million respectively.

Once the pair has been chosen, the last step of the strategy is to determine the price range in which we will provide liquidity. To do this, we will rely on three indicators that can be used for free in Trading-view:

1. The 200 EMA, fundamental to detect the trend of an asset.
2. Rob Booker Knoxville Divergence, which will allow us to detect price divergences.
3. Support and Resistance Dynamics, a script designed by the programmer Lonesome The Blue that allows us to see specific price ranges based on strong support and resistance.

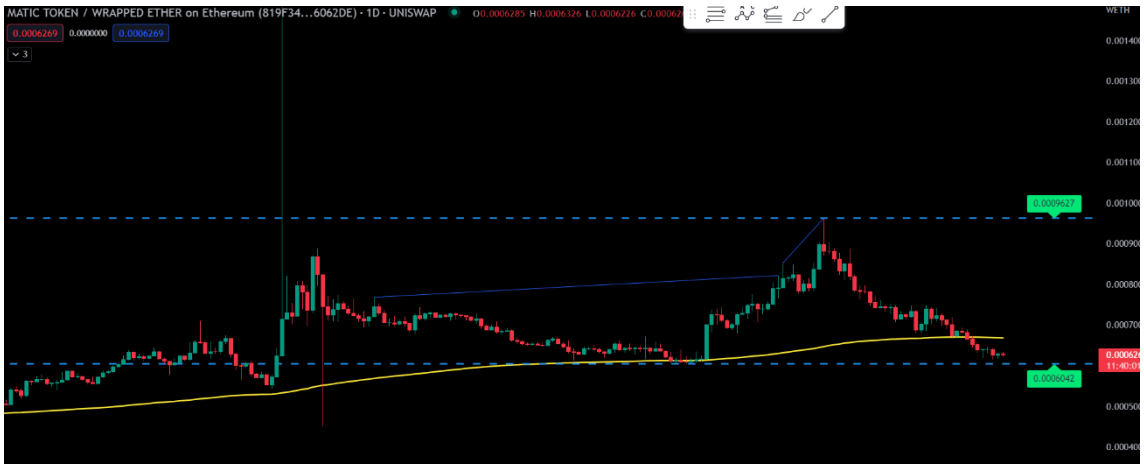
As for the time frame, one day will be chosen, as it is usually the most representative for operations with a duration ranging from one week to several months. The proposed indicators do not need to be edited and this is how they would appear on the chart:

Figure 7: Ethereum/Tether in Trading-view

As you can see, we have a blue diagonal line (Rob Booker), a yellow line (EMA 200), and a series of green labels that mark the supports (below the price) and resistances (above the price). As for Rob Booker's Knoxville Divergence, it is a counter-trend indicator designed to identify potential reversals in price movement. It utilizes the Momentum Oscillator and RSI, focusing on price and momentum divergence. For example, when the indicator suggests a bearish Knoxville Divergence (RSI21 > 70 and Momentum < 20), it implies an impending reversal in the market. Traders use it to predict trend changes and make informed decisions in their trading strategies. This tool is valued for its ability to signal potential price reversals, aiding traders in timely market entries and exits.

Taking into account what we observe on the chart, the current price of $1744.61[3] above the EMA indicating bullish strength, we could consider opening two types of range: a more conservative one from $1,150 to $2,030 and a more aggressive one from $1,369 to $1,900 (price slightly above the divergence marked by the Rob Booker). The fact that the price is above or below the 200 EMA is a clear sign of strength or weakness of the asset, especially on the daily chart. In the first case, the biggest risk we run is to exit above the range with 100% of the position in dollars, while in the second case the risk is to stay with 100% of our position in ETH, which would mean a loss of value in dollars of the pool. If we look at the case of WETH-MATIC, the best option would be a range of 0.0006042 below and 0.0009727 above[4]:

Figure 8: Ethereum/Matic in Trading-view




Finally, liquidity in the MATIC-USDC pair should range between $0.94 and $1.56:

March 25, 2023, at 13:00h.
March 25, 2023, at 13:00h.

Figure 9: Matic/USDC in Trading-view


Once the concentrated liquidity range is open, we connect our wallet to Revert Finance to have access to all metrics related to our position.

Finally, compound interest can be applied with the fees received to expand the size of the pool. Uniswap does not allow us to do this in an automated way, but it is possible to do it through Revert Finance, although our strategy contemplates a periodic collection of fees and a full conversion to dollars for two reasons: the first is to be able to mitigate the impact of non-permanent loss in case the volatile asset has sharp falls and we go out of range downwards (STABLE-CRYPTO); the second reason is that, if we apply this strategy in bear market, our purpose is to accumulate liquidity in dollars to be able to take advantage of possible falls in the markets, and we can also use that liquidity to diversify our investment portfolio in other types of assets.

## 5. Conclusions

In this paper, the aim was to provide a more detailed view of concentrated liquidity and to propose a strategy for liquidity providers in Uniswap V3. In the theoretical framework, two starting questions were posed: first, what strategy can be used to provide concentrated liquidity in Uniswap in view of the macroeconomic situation. Secondly, how could one choose the best pairs and optimize the choice of the range. To answer the first question, an analysis of the current macroeconomic context has been carried out and a strategy has been proposed based on the Fed's pivots and interest rate hikes. As for the second question, a series of guidelines for choosing the best pairs and for determining ranges with the help of three free indicators in Trading-view have been marked in this article.

Providing concentrated liquidity is one of the best strategies in DeFi right now to minimize the impact of a bear market and to make the most of the available liquidity. Thanks to the

addition of layers 2 to Uniswap, the barrier to entry is no longer so prohibitive and it is much more cost effective to create a range because you no longer have to pay the high Ethereum network fees every time you sign a trade. The strategy presented in this article is designed for fairly large ranges that take the 1D timeframe as a reference, which allows a more passive management of the position, while limiting the impact of out-of-range non-permanent loss, which is indirectly proportional to the size of the range.

Finally, while this strategy does not eliminate the risks associated with the decentralized finance industry, it offers a discrete range of possibilities for diversifying our liquidity, and also aims to lay a foundation for future research in the DeFi ecosystem. It is difficult to know how decentralized finance will evolve in the future; however, as Peter Drucker said, the best way to predict the future is to create it.

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