

Sushi: A year in review, 2021

By Eric Hart

Introduction

Given the recent turmoil surrounding Sushi—mismanagement, infighting, and lack of information, it's time to take a step back and see how it performed in 2021. The future is uncertain for the DAO and the development team, but we can attempt to make a valuation of Sushi given its fundamentals and where it stands in the competitive landscape. How did it compare to the rest of DeFi in 2021 and is it a good investment going into 2022?

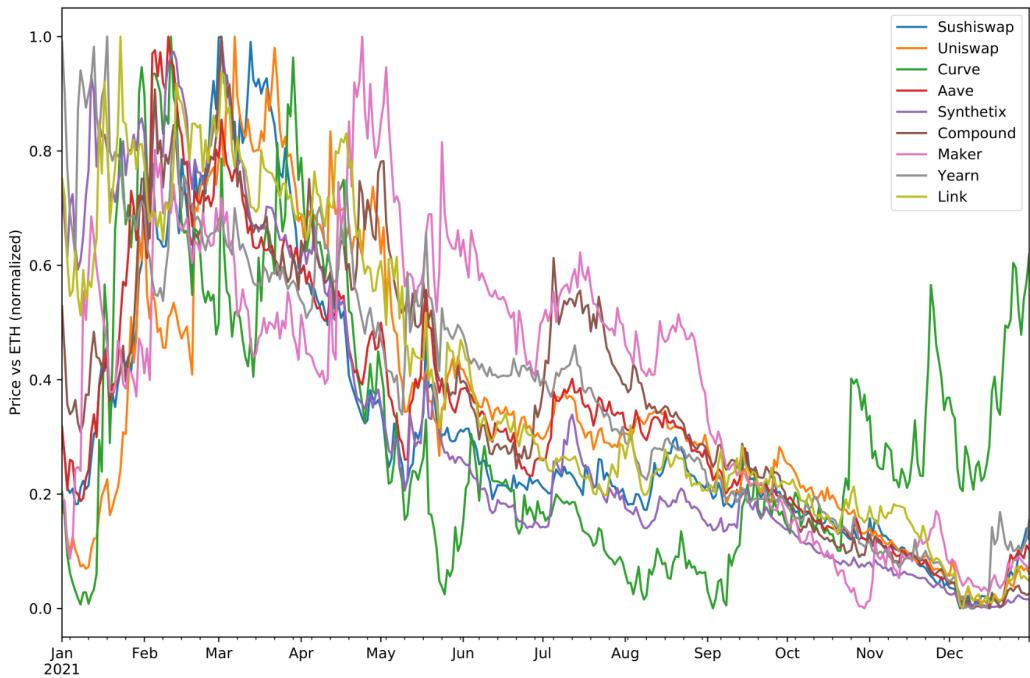
Conceived in a joke tweet (like many things in crypto) and born as a Uniswap fork in the last days of "DeFi Summer" (2020), Sushiswap itself, became the protocol that launched a thousand forks. Once the darling of DeFi, it was pronounced dead at least twice as narratives and price action swung against it. The question is: has Sushi gone sour or is it ripe for another comeback? Although there is potentially a restructuring of the DAO in the works (and [new leadership](#)), we will focus on Sushi's historical performance in 2021, how it stacks up against its peers, and the fundamentals of their main product, Sushiswap, the decentralized exchange (DEX).

Historical performance 2021

Sushi's token price has been grinding down for most of 2021, along with the rest of the decentralized finance (DeFi) "blue chips." For this analysis, we've considered the largest DeFi protocols by market cap that existed for all of 2021. Although it is common for price action to be divorced from fundamentals in crypto, it is useful to see how Sushi measures up against the rest of DeFi and particularly the other leading decentralized exchanges (DEXes).

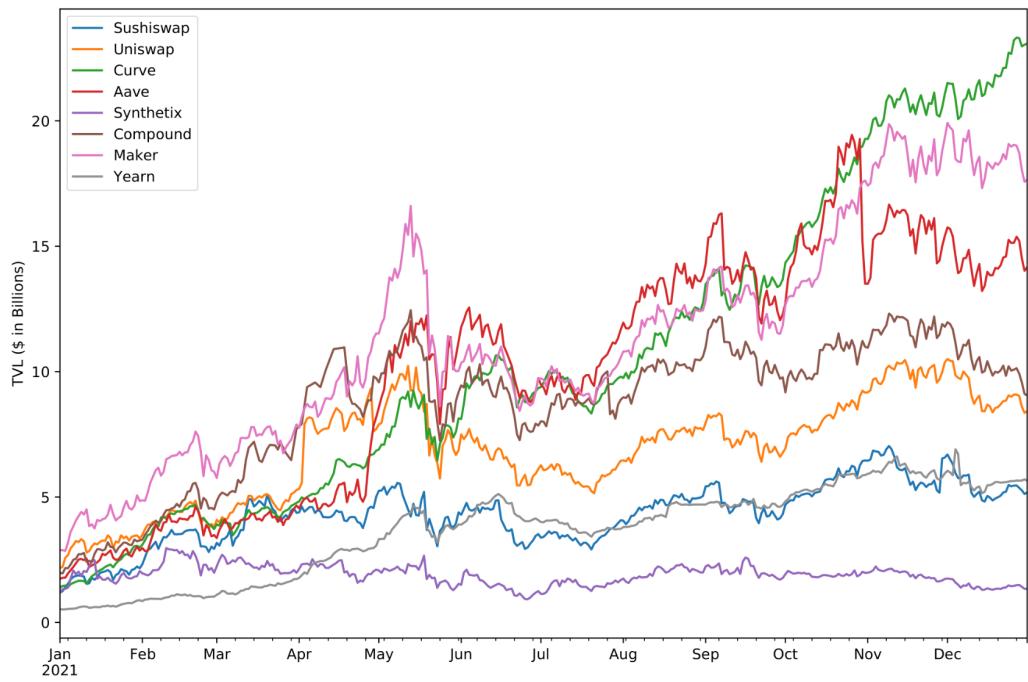
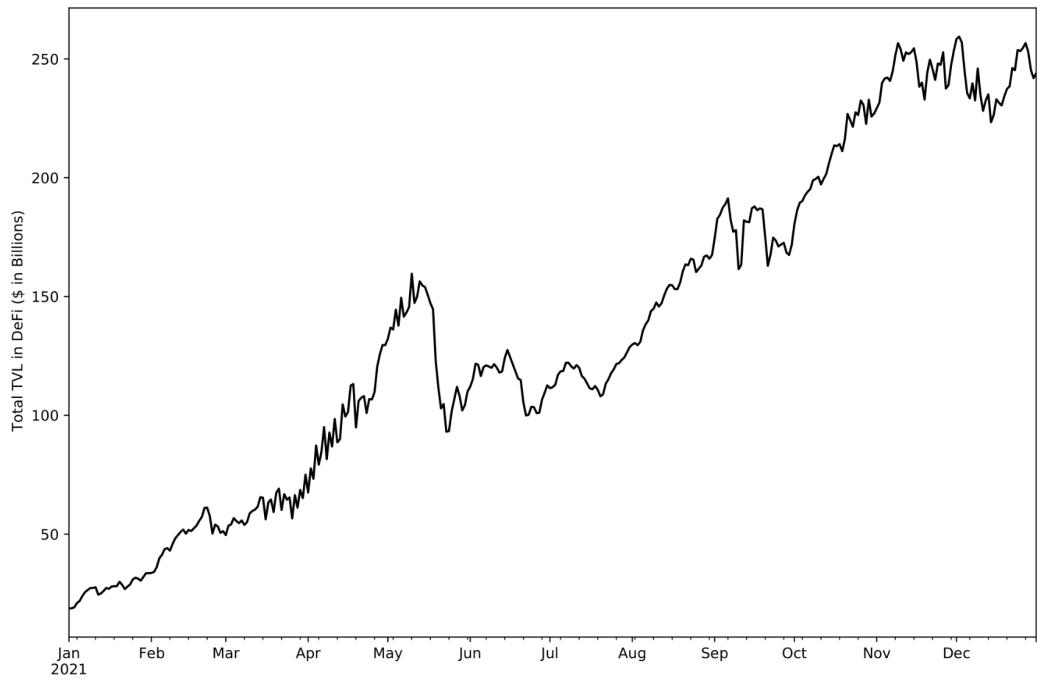
DeFi - Price vs ETH

After a big run early in the year, DeFi has struggled compared to other sectors (especially in ETH terms). As narratives moved on to NFTs and non-Ethereum chains so did the positive price action. Only Curve emerged as an outperformer vs ETH in Q4 after lagging behind the other protocols for most of the year.



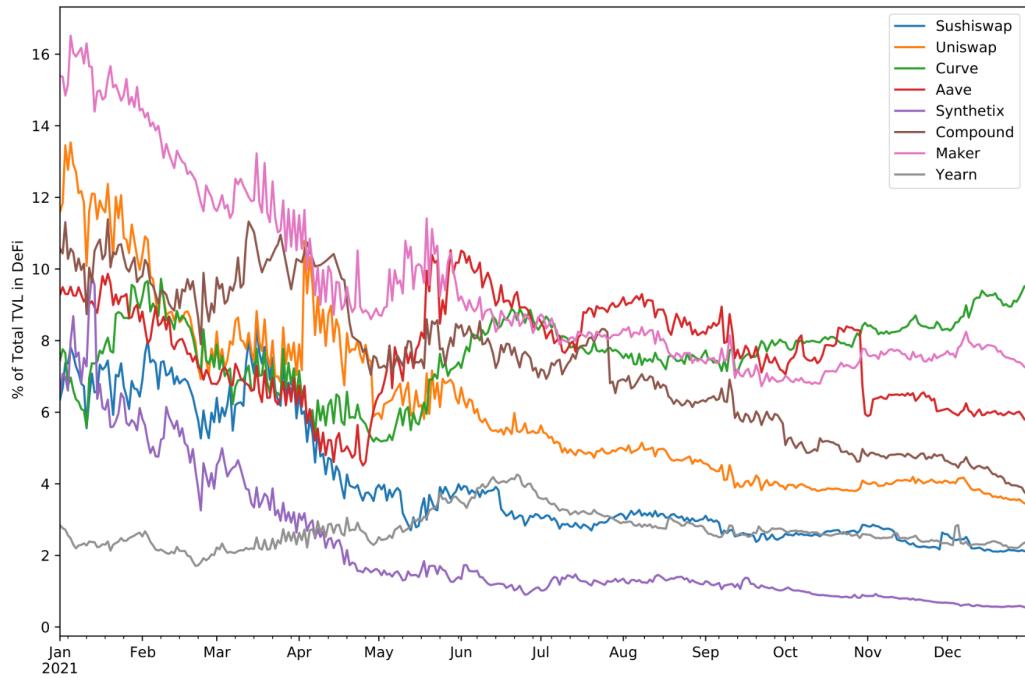
DeFi - TVL

Despite flagging token prices, total value locked (TVL) in all of DeFi proceeded at a blistering rate in 2021 (from ~\$18B to ~\$250B, a 1388% increase), even shrugging off the sector-wide steep drawdown in May (\$50B+). TVL has increased substantially for nearly all the DeFi “blue chips” barring Synthetix (which has been transitioning to Optimism). Curve, Maker, and Aave were the clear winners. Uniswap continued to outpace Sushiswap, its most direct competitor, although Sushiwap still increased its TVL ~5x. Overall, lending protocols appeared to fare better than DEXes, with Curve being the notable exception. However, Curve’s functionality also differs considerably from Uniswap or Sushiswap, with a focus on stablecoin swaps and unique tokenomics. Overall, it’s important to note that some protocols (like Sushi) incentivize liquidity with native token rewards and others do not, and this may play a role in their ability to attract and retain liquidity.



DeFi - TVL Dominance

As many new DeFi protocols entered the market, most of the leading incumbents inevitably lost market share (their proportion of the overall capital flowing into the ecosystem). However, some protocols retained their TVL better than others. Despite large fluctuations throughout the year, Curve and Aave stayed relatively strong while Uniswap and Sushiswap were hit harder. This is likely due to more competition in the traditional DEX space, especially given the rise of alternative chains with cheaper fees. Another possible explanation for this is the somewhat bearish turn of the market midyear and the propensity for lending protocols and Curve to harbor more stablecoins than DEXes like Sushiswap and Uniswap. Interestingly, Maker, which was the clear leader in TVL at the beginning of 2021, still sits near the top at the end of the year, but actually lost around 50% of its TVL market share. On the other hand, Curve had massive growth in TVL and also maintained (if not grew) its market share.

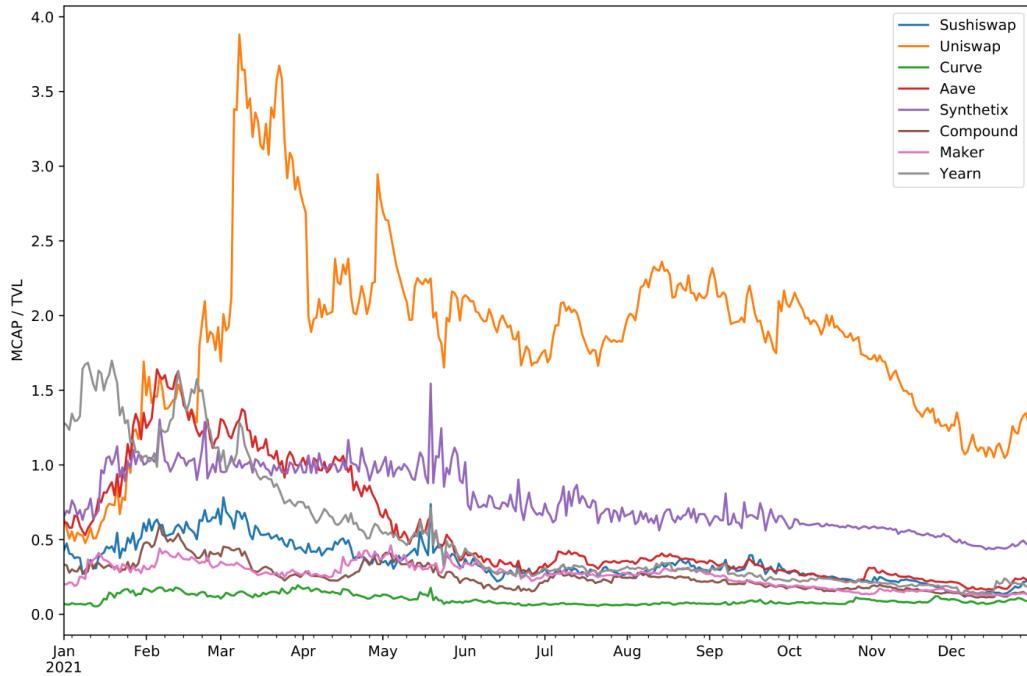


DeFi - Market Cap / TVL

One way to assess a protocol's value is to compare its market capitalization to its TVL. A ratio less than 1 means that the protocol is valued less than the assets deposited in it. Hence, a smaller MCAP / TVL ratio suggests an undervalued protocol and a larger ratio suggests it's overvalued. This metric allows protocols to be compared on the same footing.

As TVL grew and market caps failed to keep pace throughout the year, most protocols exhibited declining MCAP / TVL ratios, indicating that DeFi as a whole may be undervalued. Despite

lagging in sheer TVL, Sushi appears to be a severely undervalued protocol especially when compared to Uniswap which suffers from an outsized market cap and has by far the highest MCAP / TVL ratio of the considered DeFi protocols.



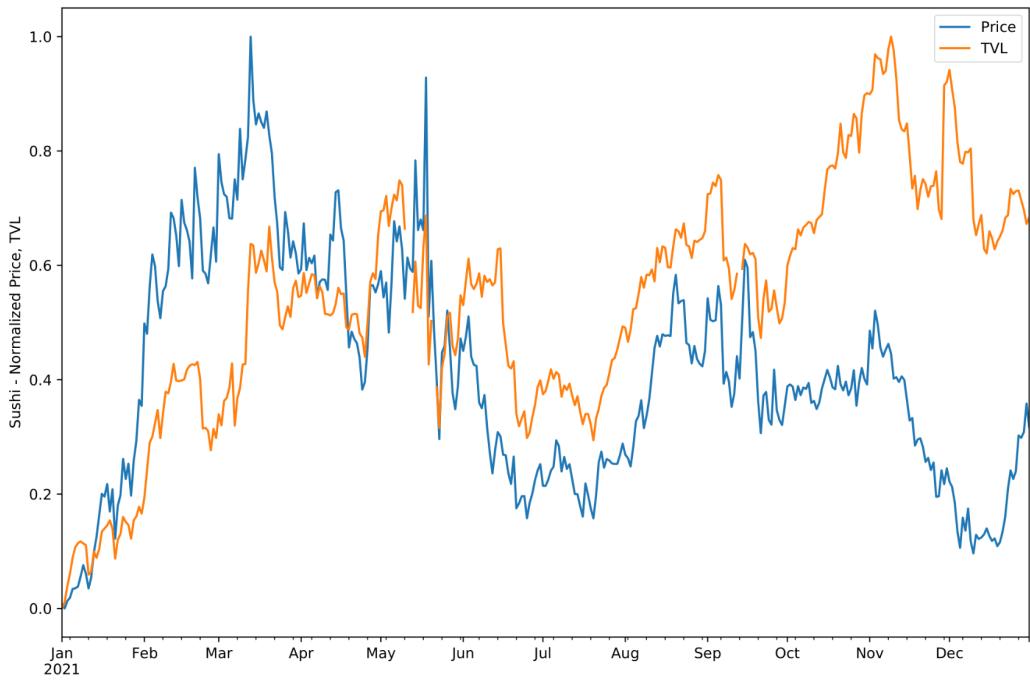
Sushi - Price & TVL Correlation

Given the oscillating nature of Sushi's price and TVL, an interesting question arises: are they correlated? For most of the year, price and TVL were tightly correlated (mean .63, 14-day mov. win.) until diverging in Q4 when TVL continued to increase and the price plummeted. This dislocation is likely due to divergent narratives and fundamentals.

Correlations in asset price and TVL could reflect the natural reflexivity between the two— as sentiment fluctuated, mercenary capital moved with the changing yields and mounting opportunity costs. Furthermore, Sushi's fee model, which we will discuss shortly, can contribute to this correlation by creating an incentive structure that couples the asset price and the revenues distributed to token holders, which, in turn, can incentivise (or disincentivise) capital deployed in the protocol.

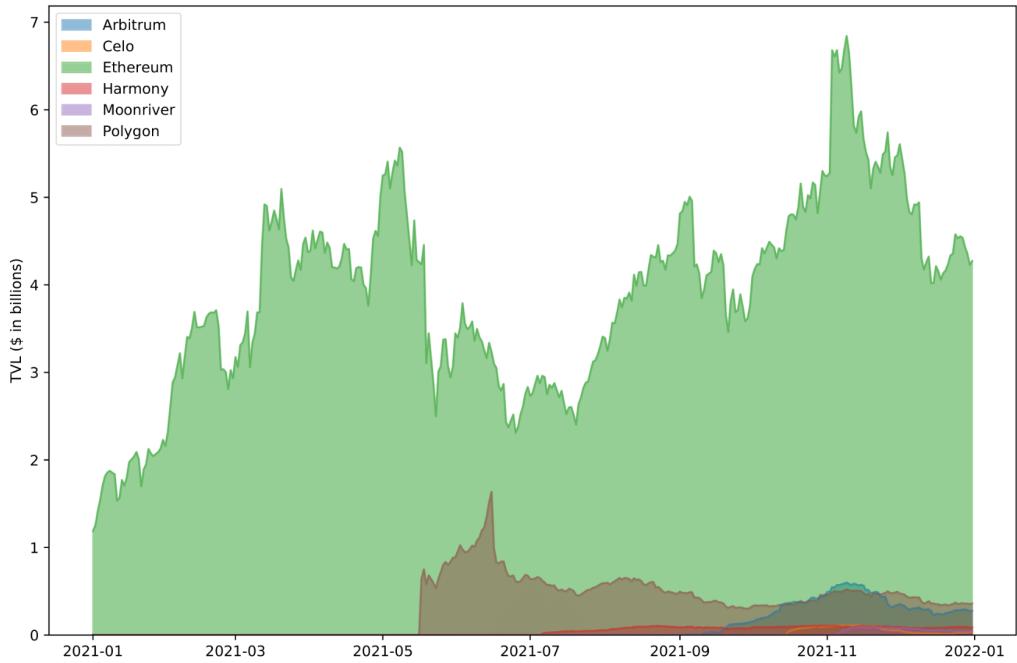
As Andre Cronje [recently observed](#):

"Fees are often used [sic] for "buyback" models, while this seems positive for the protocol, this means the fees themselves are correlated to the protocol's token price, this volatility is a blessing if prices go up, but a curse when prices go down."



Sushi - TVL across chains

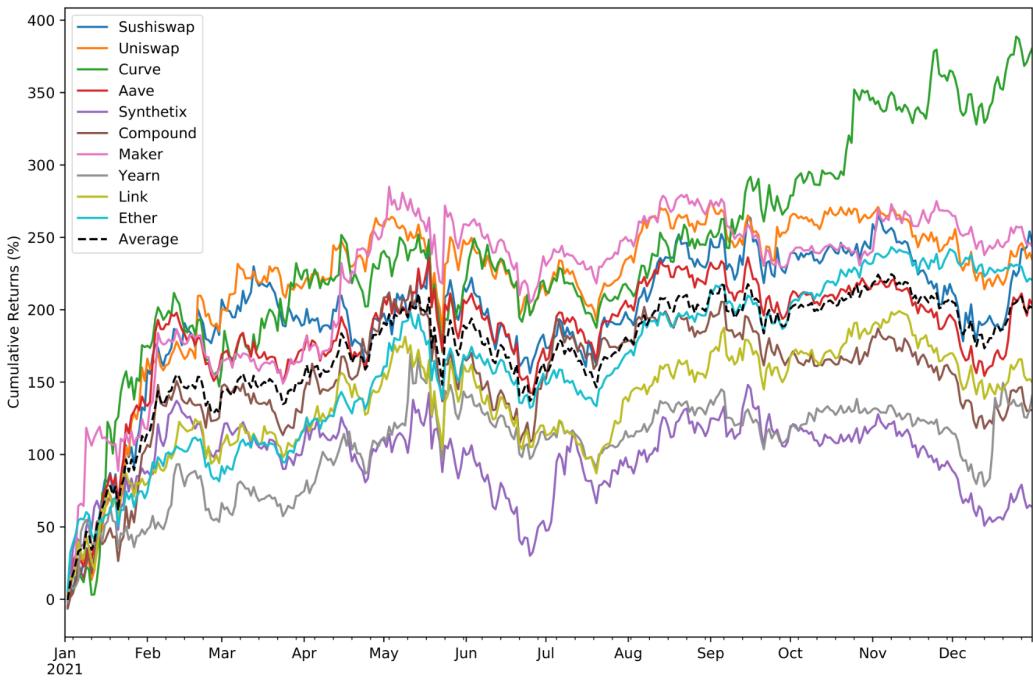
Sushiswap relentlessly expanded to other chains in 2021, now totaling 14, whereas Uniswap only recently launched on layer-2s and Polygon. Despite the meteoric rise of other chains in 2021, Ethereum still dominates TVL for Sushi. Only Polygon and more recently Arbitrum made a substantial contribution (only chains with TVL >20M are shown in this figure). This is in line with DeFi more broadly in which Ethereum still claims 63% of all TVL.



DeFi - Cumulative Returns

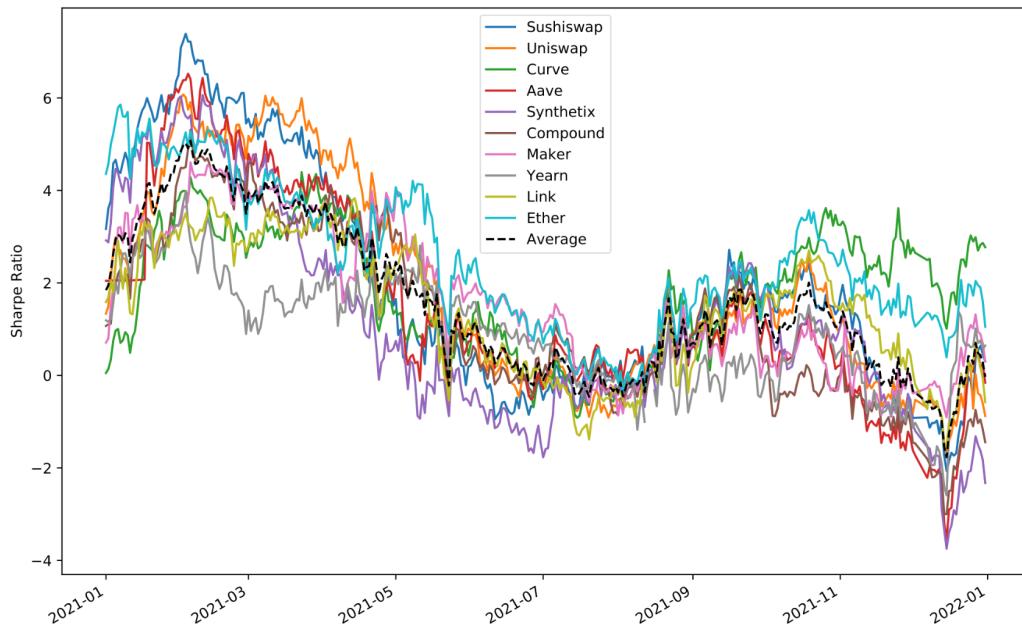
DeFi protocols experienced massive gains in Q1 and then languished the rest of the year. Sushi incurred a max drawdown of 77.7% since its highs in March where it was up almost 6x, but it finished the year strong and beat the average DeFi return and Ether. Although Sushi lagged behind Uniswap for much of the year, its recent rally has allowed it to catch up.

Sushi's returns were highly correlated to the rest of DeFi (mean ~0.7). Unsurprisingly, Sushi was most correlated with Uni (.76), and least correlated with Maker (.53). Thus, Sushi represented reasonable exposure to DeFi but could not escape the sector-wide trends. Notably, Curve outperformed again.



DeFi - Sharpe Ratio

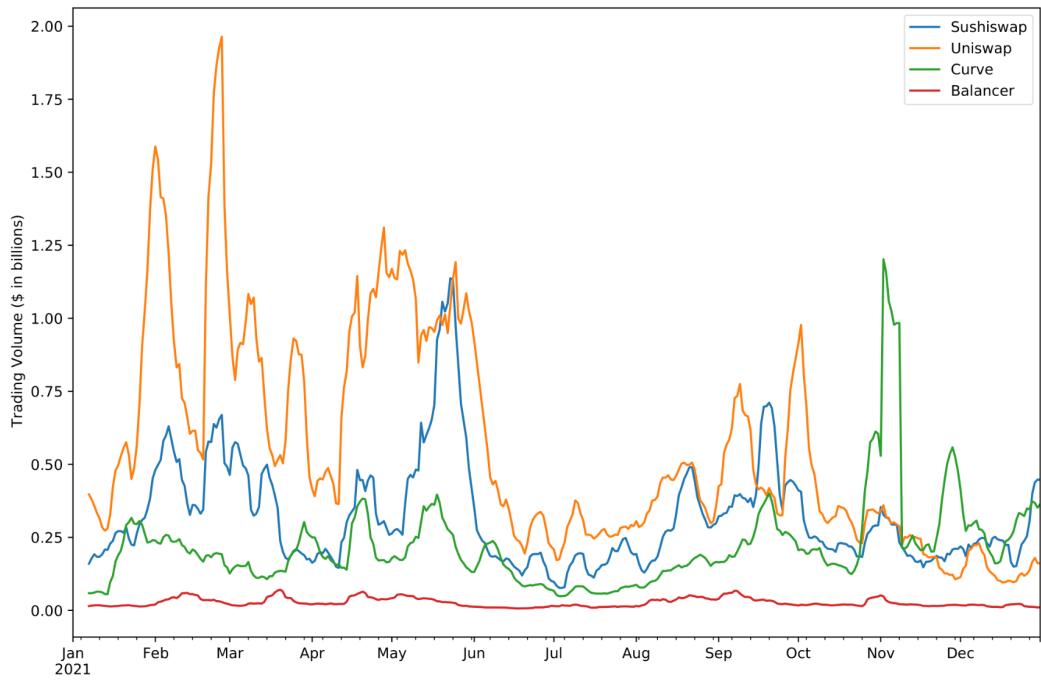
Sharpe ratio, which adjusts for the volatility of an asset, revealed that Sushi outperformed most of DeFi in Q1, but all DeFi protocols except Curve underperformed Ether by the end of the year. Both returns and volatility decreased as the year progressed as capital rotated back to Ether or to other emerging sectors.



Comparison to other decentralized exchanges

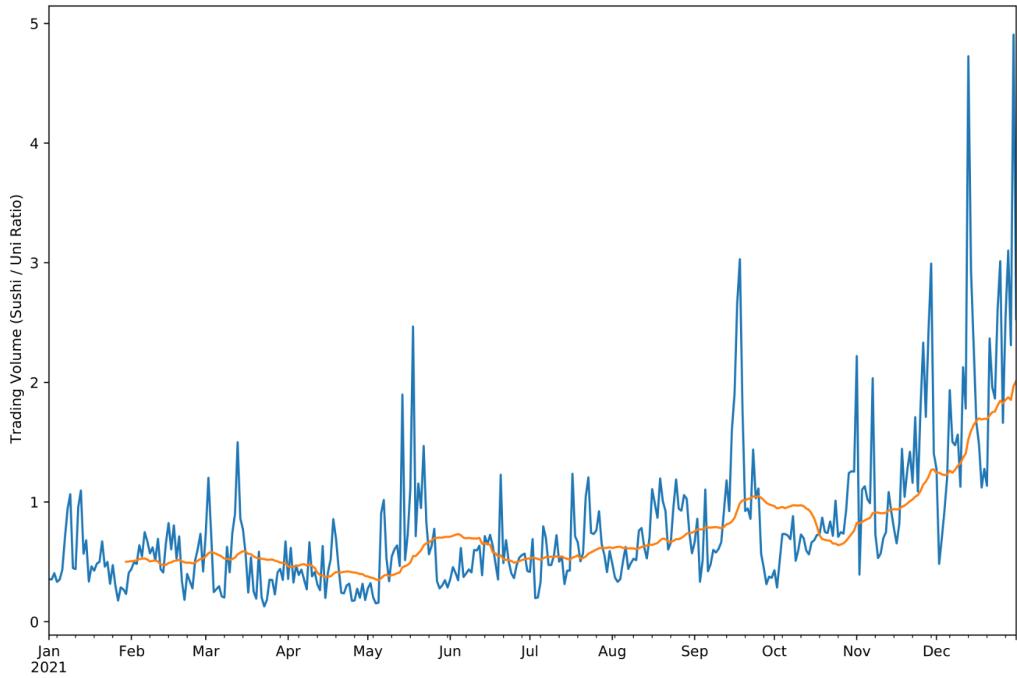
DEX - Trading Volume

Trading volume is one of the primary indicators of an exchange's success. Here, we consider the most used DEXes on Ethereum, still the leading chain by TVL by far (62%+). Uniswap dominated volumes for most of 2021 especially in the first half of the year. Sushiswap maintained second place, but both Sushi and Curve gained on Uniswap in Q4. It's worth noting that although Curve was the uncontested leader in TVL, Uniswap led significantly in trading volume. This again speaks to the differences in product offerings. Uniswap and Sushiswap have a dizzying number of pools that serve the long tail of assets, whereas Curve is restricted to a few pools with highly correlated assets. Balancer was distant fourth place in trading volume. Volume declined across the board in the latter half of the year as the spring mania died down, but another contributing factor could be the rise in non-Ethereum chains with cheaper transaction fees.



Sushiswap vs Uniswap Trading Volume

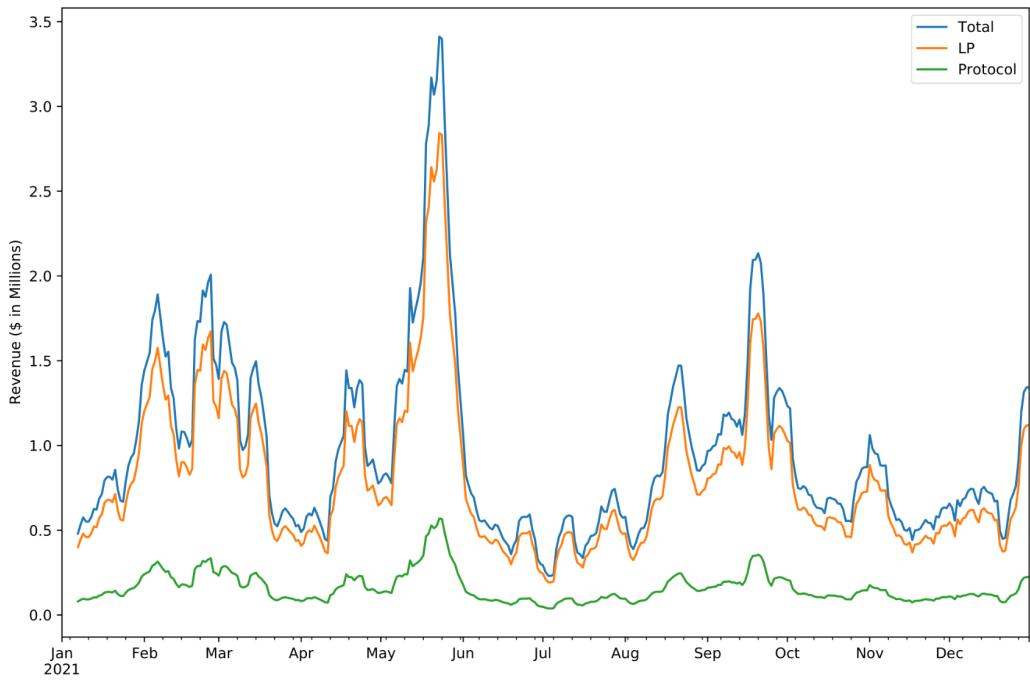
A head-to-head comparison between Sushiswap and Uniswap revealed that Sushi did about half the volume of Uniswap for most of 2021, but in Q4 it has been eating away at that market share. In December, it flipped Uniswap's daily volume (7 day mov. avg.), and has almost doubled it by the end of the year.



Sushi - Revenue Breakdown

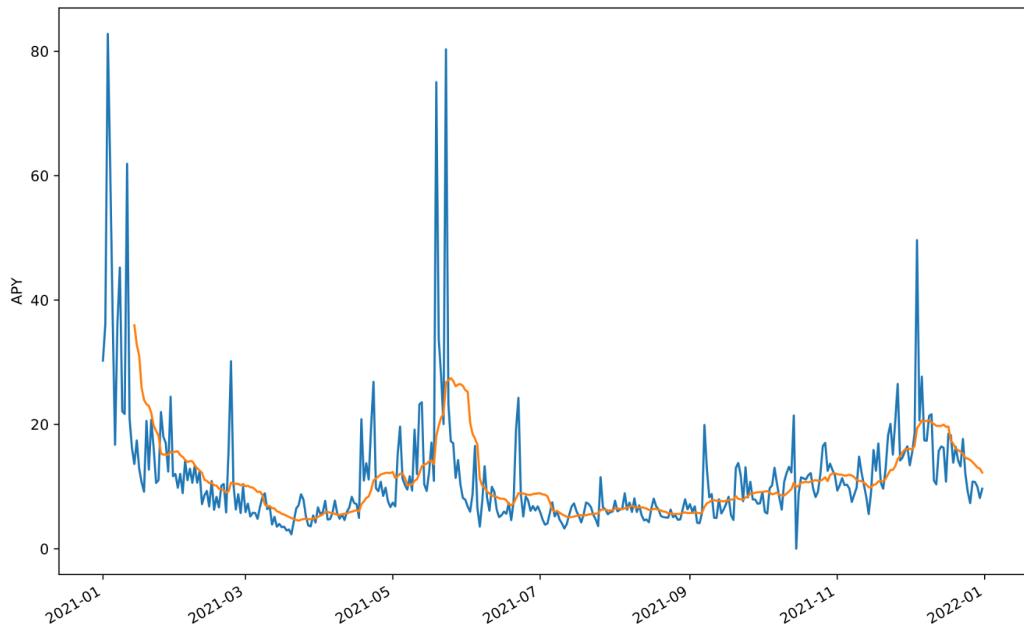
Sushiswap collects a 0.3% fee on each trade, of which 0.25% (5/6th) goes to the liquidity providers (LPs) and 0.05% (1/6th) goes to the protocol (i.e. Sushi token holders). Sushi averaged close to a million dollars in daily revenue (7 day mov. avg.) for the year, with \$160,000 going to token holders.

Uniswap (V2) collects the same fee (0.3%) but 100% of it goes to liquidity providers and none of it goes to Uni token holders. Uniswap (V3) has a variable fee structure (currently 0.05%, 0.30%, 1%, 0.01%) but all revenues still go to LPs. Curve collects a 0.4% fee and 50% of it goes to LPs and 50% goes to the protocol (veCRV holders, “voting escrowed” CRV). For the entire year, Uniswap averaged 1.6M in daily revenue and Curve averaged close to 900K.



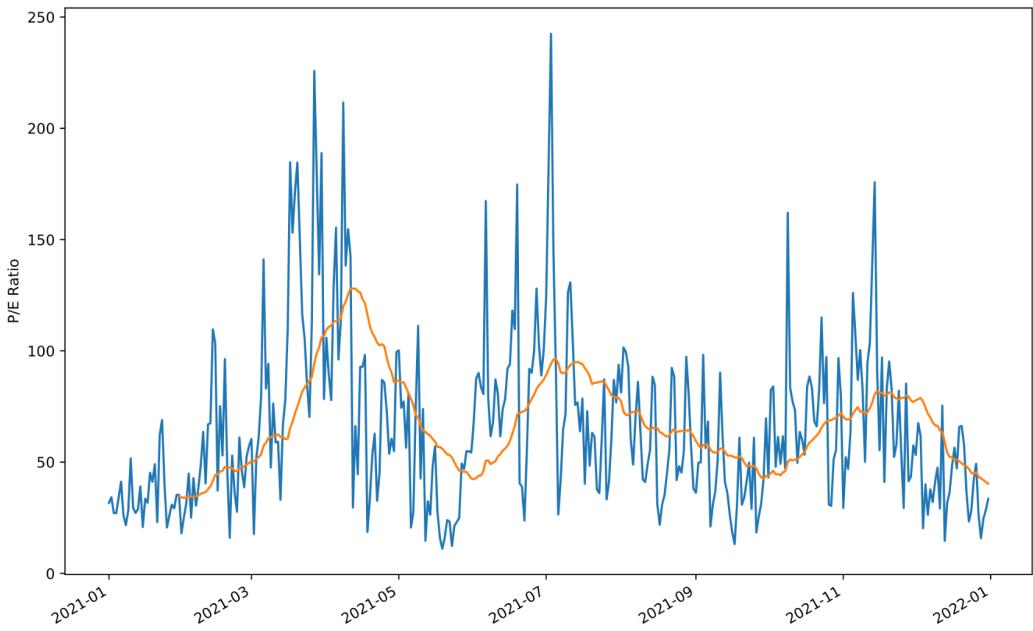
Sushi - Protocol Revenue

Revenues from trading fees are paid to Sushi token holders when they stake Sushi for the "xSushi" token. xSushi tokens provide a claim on protocol fees based on their share of the pool. The fees are distributed in the native token (Sushi) via buybacks, which has the unintended consequence of creating a correlation between the asset price and the fees, which was discussed earlier. APY has fluctuated greatly throughout the year with trading volume and token price, but averaged 11.4%. This is a substantial return given that it comes from simply holding the token.



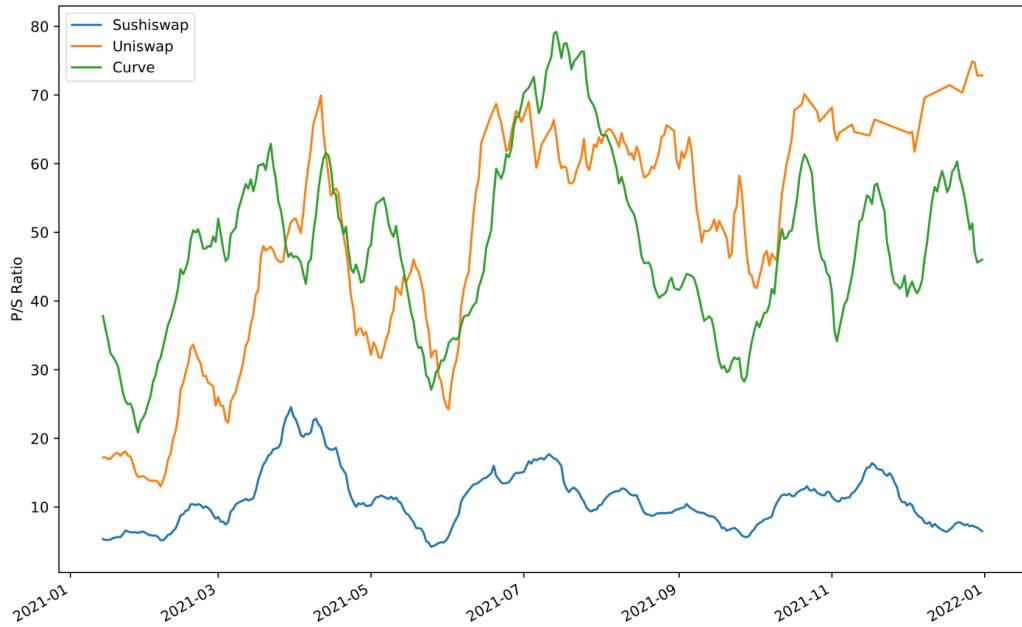
Sushi - P/E Ratio

Price-to-earnings is a traditional valuation metric that compares the market price of an asset to its earnings. For DEXes, earnings are the protocol revenues (i.e. the proportion of trading fees going to token holders). A lower number signifies a more undervalued protocol. Sushi's P/E has varied with volume and volatility over the year but sits at an attractive 37x at the end of the year compared to its competitors like Curve (153x) and Uniswap, which can not be directly compared because it does not distribute any revenue to token holders. According to Token Terminal, Sushi has one of the best P/E ratios among DeFi protocols for the entire year. More recently, some newer DEXes on alternative chains like SpookySwap (on Fantom) have sported extremely attractive P/E ratios (12x) but it's still too early to tell if it's sustainable.



DEX - P/S Ratio

Price-to-sales ratio (P/S) is another traditional valuation metric that we can use to compare protocols. For DEXes, sales are the total revenues generated from trading fees, regardless of whether they accrue to LPs or the protocol. Like the P/E ratio, a lower value is better. The annual average P/S ratios for Sushi, Uniswap, and Curve were 11x, 47x, and 47x respectively, and they sat at 6x, 72x, and 46x at the end of the year. According to this metric, Uniswap has become more overvalued as 2021 progressed and Sushi remains relatively undervalued and has only become more so. Curve's P/S ratio, although volatile, has remained near its average on the year.



Sushi Tokenomics & Competitors

Finally, differences in the tokenomics of these protocols might affect their valuation. Sushi, Uni, and Curve tokens all confer voting rights in their DAOs. Sushi and Curve direct a portion of their revenue from trading fees to their token holders, and Curve has pioneered a vote locking mechanism to choose which liquidity pools are incentivized.

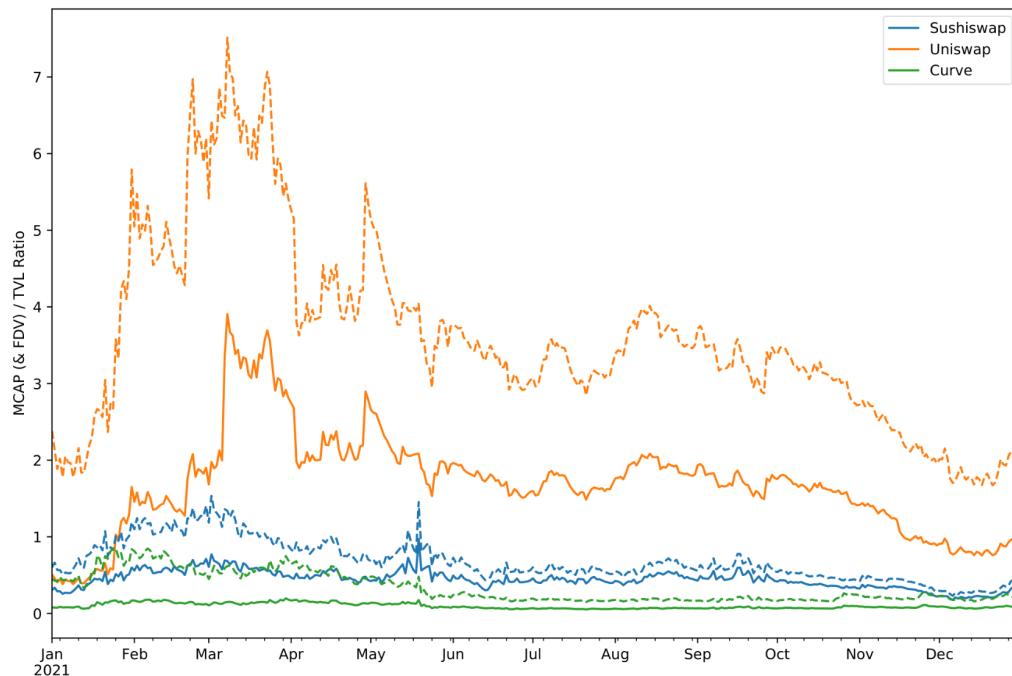
In March 2021, the final vested Sushi rewards from the initial wave of yield farming was distributed, ostensibly removing the remaining sell pressure from early yield farmers. Less than 20% of Sushi's supply remains to be distributed and emissions will soon drop to less than 10 Sushi per block. Emissions will completely finish by Nov. 2023 and Sushi will have a 250M hard cap supply.

Uniswap minted 1B supply at genesis (Oct. 2020) allocating 60% to the community (15% airdropped, and the rest to the treasury for liquidity mining incentives, grants etc.) and 40% to the team/investors/advisors with continuous vesting over 4 years (until Sept. 2024). A growing proportion will be allocated to the latter group and a declining proportion to the community treasury. 55% of Uni's total supply has yet to be distributed. After 4 years, Uni will have 2% annual inflation.

Curve's initial supply was 1.3B in August 2020, but none of it was distributed immediately. Instead, it is released according to a continuous vesting schedule. 57% of Curve's supply has yet to be distributed and the max supply will eventually be 3.03B. Over the next 4 years the supply will increase to 2.27B (a 2.7x increase). Notably, Curve has a low circulating supply because of the vote-locking mechanism but a comparatively high inflation rate compared to the other protocols. Curve also has a fundamentally different incentive system that we won't discuss in detail here (see the recent [Messari Hub report](#)). In brief, it encourages locking Curve tokens in return for voting rights for choosing which liquidity pools receive a boost in rewards. This model has been very successful and has been copied by many other protocols.

DEX - FDV / TVL

To attempt to account for these differences in tokenomics, we can calculate the fully diluted valuation (FDV; dashed lines) of a token by taking its max supply multiplied by its price (rather than the circulating supply as with market cap). Like the MCAP / TVL ratio (solid lines), a larger number suggests the protocol is overvalued, whereas a smaller number (especially under 1) would be considered undervalued. Uniswap's FDV only exacerbates its overvaluation. Curve only looks slightly less attractive and more on par with Sushiswap, which is the least affected by FDV since most of the tokens are already in circulation. Crucially, both Uni and Curve are inflationary long term and Sushi is not, which is not accounted for in this analysis. Hence, all other things being equal, Uni and Curve also stand to be diluted more in the long run than Sushi.



Summary

Sushi was primarily a victim of the underwhelming year that all of DeFi experienced given the meteoric rise of other sectors—NFTs, alternative layer 1s/sidechains, and GameFi. Despite substantial growth in TVL, volume, and revenue, Sushi's token price has been sluggish. By many metrics, Sushi is still one of the top DEX protocols and one of the more successful DeFi protocols as a whole. Valuation ratios like MCAP/TVL, FDV/TVL, P/S, and P/E signal that Sushi is significantly undervalued.

Compared to Uniswap, its closest competitor, it has less absolute TVL and volume, but it appears to be far less overvalued. In Q4, Sushiswap gained on Uniswap in volume and given Sushi's fee structure, token holders have made on average 11% yield over the last year just for staking Sushi (this would be zero on Uniswap). Uniswap, however, could be more attractive to liquidity providers given the proportionally higher fees (in some pools) and historically higher volumes. Sushi also continues to provide yield farming incentives, so it will be interesting to see what happens when these rewards end. Curve has beat all expectations in 2021 and has become one of the standout protocols in DeFi, but given its fundamentally different focus, it is less likely to be a direct competitor to Sushi.

This research primarily focused on Sushi's core product—Sushiswap (the DEX) but Sushi has launched several other products this year—Kashi (leverage and lending), BentoBox (yield vaults), Miso (token launchpad), and Shoyu (NFT marketplace). These have shown potential but have yet to garner widespread adoption. Sushi has experienced some growing pains regarding the DAO and development team, and this is where much of the uncertainty lies. Considering this is one of the first large scale DAO experiments, it's hardly unexpected. Sushi has come a long way from its origin as a simple Uniswap fork—differentiating dramatically into a whole suite of other product offerings, new partnerships in DeFi, and embracing the multichain world early on. At the end of 2021, Sushi is still down more than 70% from its all-time high and is likely very undervalued going into 2022.

Data sources: Messari, CoinGecko, DeFi Llama, Sushi API