CURVE ($CRV)

- **TYPE:** DEX
- **CHAIN(S):** ETH, MATIC, BSC, FTM
- **TVL:** $14.1B
- **MARKET CAP:** $840M
- **CONTRACT ADDRESS:** 0xD533a949740bb3306d119CC777fa900bA034cd52

PRODUCT OVERVIEW/SUMMARY

Curve is a decentralized digital asset exchange, or DEX, on Ethereum and select Ethereum-compatible networks. As digital assets and blockchain networks proliferated, Curve expanded beyond stablecoins to exchange other digital assets across four networks. Altogether, at $14B, more digital asset value is locked in Curve than any other decentralized exchange.

In 2020, Curve launched on the Ethereum blockchain to enable low-cost stablecoin transactions with low slippage. Like other DEX projects, the protocol deployed liquidity pools as automated market makers (AMM) with which users and other blockchain protocols executed trades. Liquidity providers, or LPs, locked stablecoins, like DAI, USDC, and USDT, into pools to earn transaction fees for selling assets. Since then, Curve V2 updated the protocol's AMM pricing algorithm to enable crypto pools in addition to stablecoin pools. Today, Curve operates 22 liquidity pools while the protocol remains non-custodial for all users.

WHY IT'S INTERESTING

Product

Curve provides an automated and decentralized digital asset exchange where users can earn revenue for providing liquidity to traders. The current Curve AMM algorithm iterated on its The original, "StableSwap," design modfied the x*y=k AMM invariant equation to maintain a stable price for each dollar-pegged stablecoin pair. The Curve AMM formula concentrated liquidity for stablecoin orders at $1.00, regardless of the trade size relative to the liquidity pools. With this modification, Curve created a disintermediated exchange that simultaneously minimized cost, slippage, and helped maintain the assets' dollar pegs.

The current Curve V2 iterated on the original design to incorporate other price-stable assets. Now, users can trade many assets programmed to maintain their price relative to another asset, like wBTC and renBTC. In this case, because wBTC and renBTC are pegged to BTC, their prices should be identical, even if

demand for one exceeds the other. Just like its original stablecoin pools, Curve crypto pools adjust to concentrate liquidity at the pool's exchange price. Instead of spreading liquidity evenly across all potential pair prices, Curve's liquidity concentration limits price movements, cost, slippage, and helps stabilize price-stable assets.

TOKENOMICS

Token Utility and Supply

Curve launched the CRV governance token to establish community governance over the platform. The CRV token incentivizes governance participation by boosting LP rewards. Liquidity providers who deposit and lock CRV tokens in addition to their LP position, receive Curve's voting token, veCRV. For the last year, Curve has distributed 50% of all platform trading fees to veCRV holders as a reward for staking CRV to participate in governance.

By rewarding users to govern the protocol, Curve maintains community governance through aligned interests. Instead of a board or committee making strategic decisions, Curve depositors can vote on protocol improvement proposals. Users who profit from the platform control the platform which allows them to control their business of selling digital assets. The total supply of 3.03B CRV will be distributed over several years so participation can scale with the platform. The current final CRV distribution is planned to predominantly accrue to liquidity providers and the development team. Initial distribution was concentrated to the platform team, but total supply should favor users in the long run.

Value Accrual

All transactions with Curve pools require transaction fees in basis points of the target asset. When a trader exchanges DAI for USDC, for example, Curve delivers USDC less a 0.04% USDC transaction fee. Similarly, LPs pay 0.02% to withdraw their LP to a different asset in the same pool, though Curve pools require no fees to deposit liquidity. Taking fees for trades only helps Curve sustain its position as the low-cost solution to provide digital asset liquidity.

Average Daily APY per Curve Pool

Period	compound	y	busd	susdv2	pax	ren	sbtc	hbtc	3pool
30 Days	3.0%	1.4%	1.6%	1.1%	0.2%	0.2%	0.2%	0.1%	0.5%
90 Days	2.4%	1.9%	1.8%	1.4%	0.3%	0.3%	0.4%	0.1%	0.5%
180 Days	4.1%	5.2%	5.5%	1.5%	0.8%	0.4%	0.4%	0.3%	0.9%
365 Days	3.9%	4.8%	4.9%	1.6%	0.8%	0.4%	0.4%	0.3%	0.9%

Curve: https://curve.fi/dailystats

Average daily yields show the premium paid to LPs that provide liquidity to lending pools on Curve. Compound pools, for example, earn Curve exchange fees and Compound interest revenue because Compound uses the pool to lend assets to its users. The y pool similarly allows Yearn Finance to lend directly from the Curve pool. On the other hand, the 3 pool and all wrapped BTC pools represent price stable pools without lending. With tight spreads, these pools offer LPs the base Curve yield.

Valuation

The CRV token can be valued on a relative basis with two key multiples: Price-to-sales, P/E, and Total Value Locked-to-Market Capitalization, TVL/MC. First, P/S is commonly used to compare valuations of DEX and other native tokens that generate transaction fees for users, stakers, or holders. As P/S grows, a token's price may include value beyond the platform's current revenue. Second, TVL/MC shows total deposit value relative to the value of the token supply.

As of 9/6/21, Curve's average annualized fee revenue reached $46MM from $89B annualized transaction volume. These fees incorporate volume that rapidly declined in May and June 2021, but recovered by July 2021. Curve monthly volume in August 2021 was down -27% relative to April 2021.

Curve Fee Revenue

		(USD, MM)
Annualized Volume		88,993
Annualized Total Fees		46
Fees to LPs	0.5%	0.229
Fees to veCRV	0.5%	0.229

Curve: https://curve.fi/dailystats

Adjusted Curve Valuation

	Token Price	Market Cap	Total Ann. Revenue	TVL	TVL/MC	P/S
Curve	**$2.48**	**8,130**	**46**	**14,090**	**1.7x**	**177.7x**

Comparative analysis below shows Curve P/S that only includes fees to CRV holders. Our analysis includes all fees earned because Curve splits transaction fees among LPs and veCRV holders, with none directly allocated to the protocol.

COMPETITIVE LANDSCAPE

As noted in our SushiSwap note, competition is strong among DEX applications. SushiSwap's founding story exemplifies the commodification of AMM exchanges. Additionally, Uniswap's current lead in transaction volume, without liquidity rewards, shows a brand's strength over marginally higher returns. A competition to be the most liquid exchange at the lowest cost provides no clear edge for any competitor. Despite its wide TVL lead, Curve's limited asset offerings limit transaction volume. Other exchanges, like Uniswap and SushiSwap, offer thousands of assets for trading. Curve's price-stable specialization may be a notable exception.

Top 5 Decentralized Exchanges by Total Value Locked

	Token Price	Market Cap	Annualized Revenue	TVL	TVL/MC	P/S
		(USD, MM)				
Curve	$2.48	8,130	26	14,090	1.7x	309.9x
PancakeSwap	$24.50	5,410	732	6,000	1.1x	7.4x
Uniswap	$29.01	2,905	1,360	5,290	1.8x	21.3x
SushiSwap	$13.68	2,610	374	4,770	1.8x	9.1x
Balancer	$32.78	350	52	3,480	9.9x	62.1x

Token Terminal: https://www.tokenterminal.com/terminal/markets/exchange

Curve attracts and retains liquidity, also known as total value locked, or TVL, with key unique features among similar venues. First, LPs can earn more CRV liquidity rewards the longer they lock their CRV tokens for veCRV. Also, they can earn interest on their deposits that Compound's lending protocol uses to make loans. Second, Curve's price-stable focus mitigates impermanent loss risk. Third, LPs have more revenue opportunities on Curve than similar exchanges.

RECOMMENDATIONS

Through the end of 2021, Curve volume and fees should increase across all networks. In August 2021, the Avalance Layer-1 blockchain announced an incentive program to attract liquidity to both Curve and Aave. The two DeFi applications could benefit from exponential growth Avalanche has sustained over the last month.

Curve token value is maximized by LPs that stake CRV for four years to boost transaction fees. The LP with maximum boost earns 100% of their share of the pool's fees. In this case, an adjusted P/S that incorporates all platform revenues is the appropriate valuation multiple. Users that do not provide liquidity can also earn Curve fees by buying and staking CRV for the four-year maximum. The standard P/S would apply for CRV-only stakers, as they would forego any LP fees.

Though CRV is valued high, in either case, relative to its DEX peers, CRV demand should grow as the protocol expands beyond Ethereum. Curve became a key DeFi tool because no other protocol executes more efficient stablecoin swaps. Until this status is challenged, CRV will continue to command high multiples.

DISCLAIMER