# Defi - Interacting with Uniswap and Compound

Uniswap

The first ideas came from Vitalik, Nick Johnson and Martin Koppelmann in 2016 in a Reddit post (https://www.reddit.com/r/ethereum/comments/55m04x/lets_run_onchain_decentralized_exchanges_the_way/)

It was followed by an implementation from Hayden Adams and launched in Nov 2018

- Launched in 2018, Uniswap is a DEX featuring an AMM
- Solves the problem of illiquid assets since anyone can set up a liquidity pool
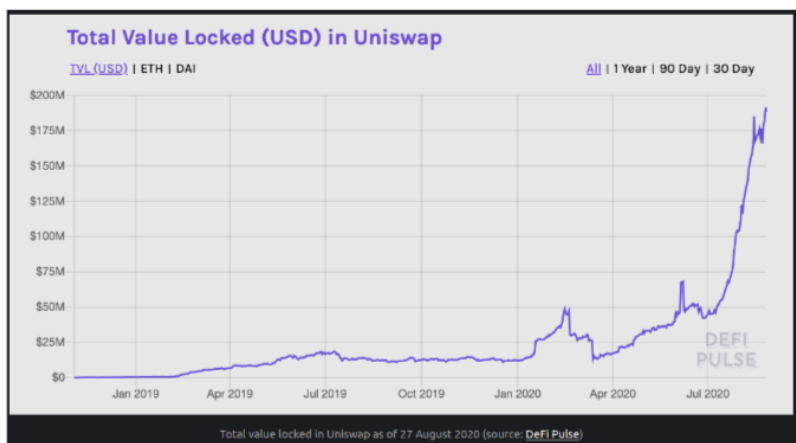
- Truly Decentralised
- Allows swap between any ERC20 pairs
- The code is robust

V2 Launched May 2020 allowing direct token swaps - halving gas fees

It solved many of the problems of the initial exchanges such as lack of incentives to provide liquidity for rarely traded assets.
It relies on a smart contract acting as an automatic market maker (AMM)

Incentivising Users

- Users deposit funds into a liquidity pool, for example ETH and USDT

- This pool (a token pair) allows users to exchange tokens

- Interacting with the exchange incurs fees

- These fees are paid to the liquidity providers

The AMM is more specifically a constant function market maker.

The term "constant function" refers to the fact that any trade must change the reserves in such a way that the product of those reserves remains unchanged (i.e. equal to a constant).
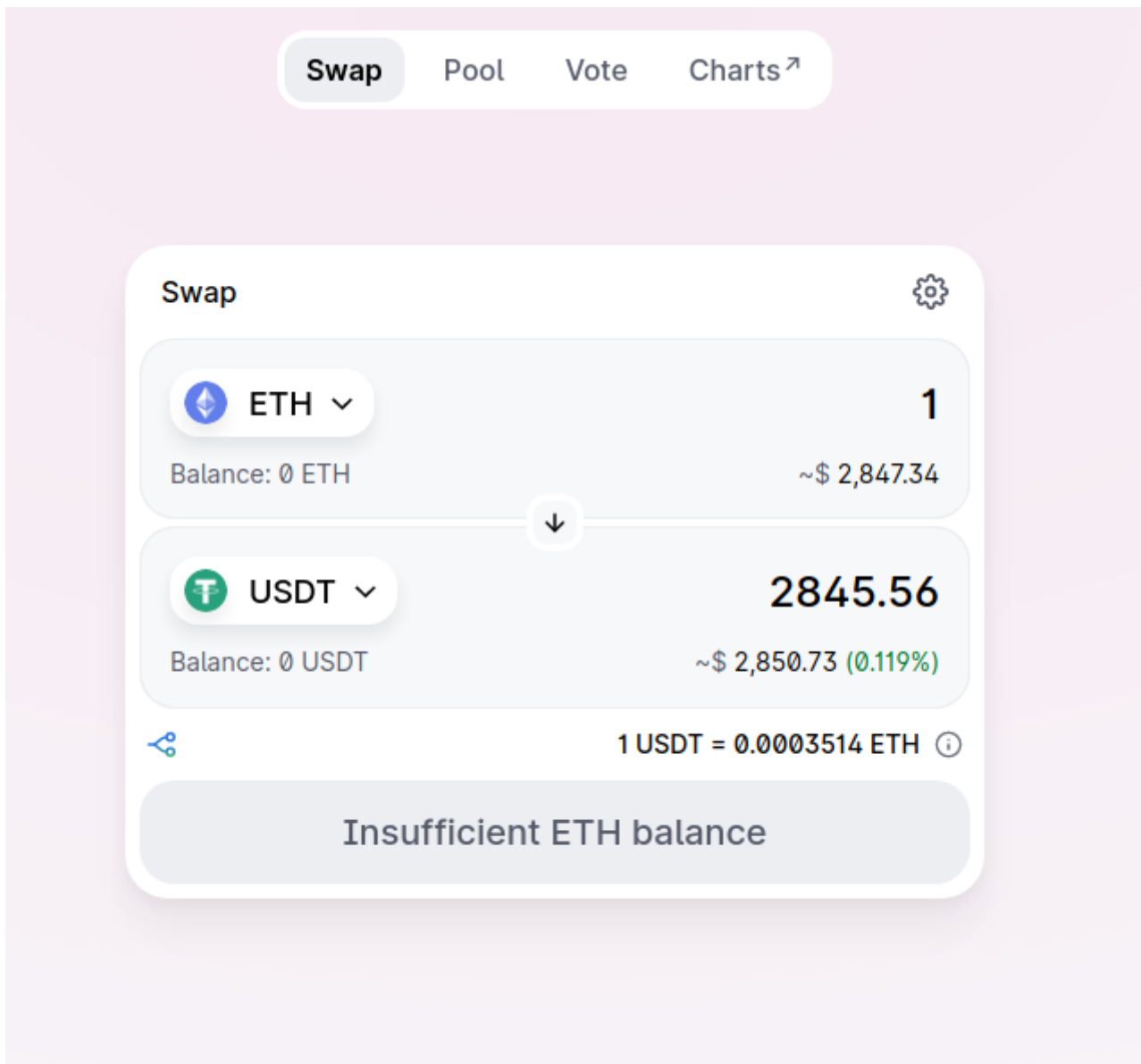
LP Tokens

Typically the liquidity provider receives LP tokens when they add liquidity, say ETH and USDT

Later they can take liquidity by providing LP tokens to the contract and will receive back ETH and USDT. Ideally they will make a profit

Risks when swapping or providing liquidity

- Slippage
  Large trades can move the price

- Impermanent loss
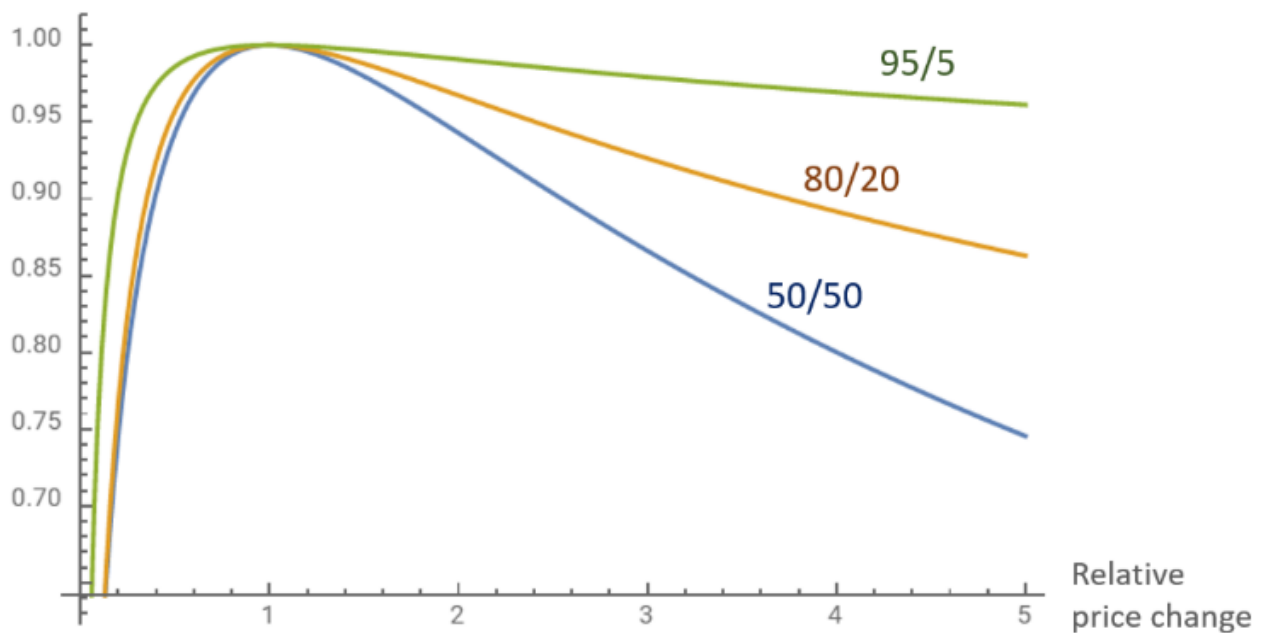 As a result of volatility

Losses to liquidity providers due to price variation

Compared to holding the original funds supplied
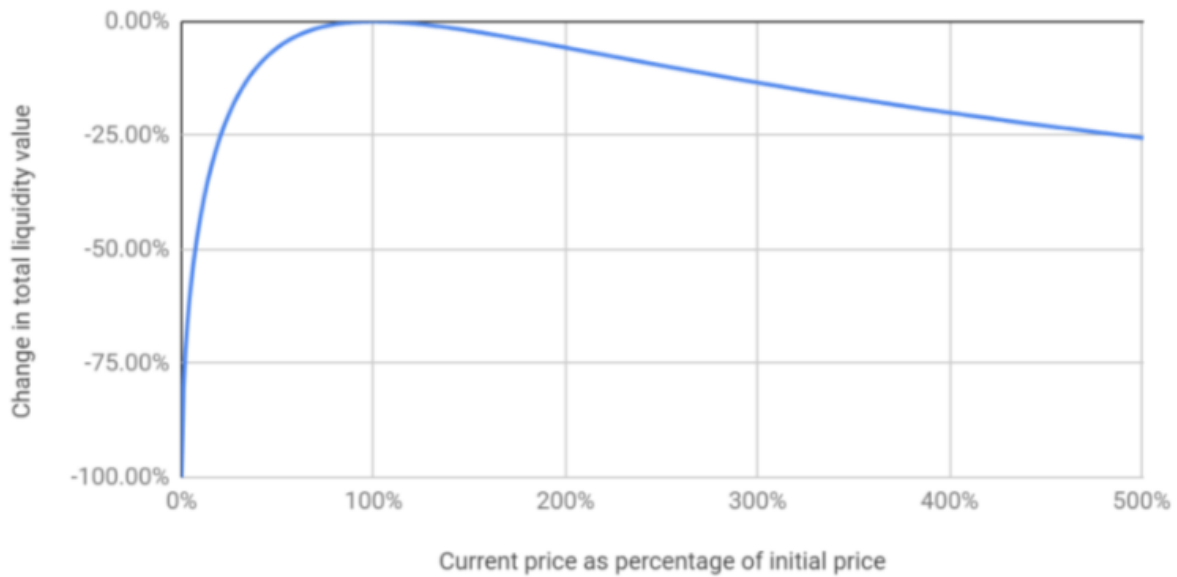
While liquidity providers can use stablecoins, yields, and rewards to help lessen the impact of impermanent loss they can also reduce this by using liquidity pools that use ratios other than 50/50. Balancer is a platform that offers liquidity pools with ratios like 60/40 or 80/20. When ETH is deposited into a pool that is 50/50 the liquidity provider has to have 50% exposure to another token. With an 80/20 pool, they only need 20% exposure to another token. You can see below how three liquidity pool ratios are affected by impermanent loss differently, with the 95/5 pool seeing the least impermanent loss.

Uniswap Details

Uniswap V3 Router

https://etherscan.io/address/0xe592427a0aece92de3edee1f18e0157c05861564

(https://etherscan.io/address/0xe592427a0aece92de3edee1f18e0157c05861564)

Code

https://etherscan.io/address/0xe592427a0aece92de3edee1f18e0157c05861564#code

(https://etherscan.io/address/0xe592427a0aece92de3edee1f18e0157c05861564#code)

Guide to single swaps

https://docs.uniswap.org/protocol/guides/swaps/single-swaps

(https://docs.uniswap.org/protocol/guides/swaps/single-swaps)

Why do we need to approve the router contract ?

Router Interface

https://docs.uniswap.org/protocol/reference/periphery/interfaces/ISwapRouter

(https://docs.uniswap.org/protocol/reference/periphery/interfaces/ISwapRouter)

Compound
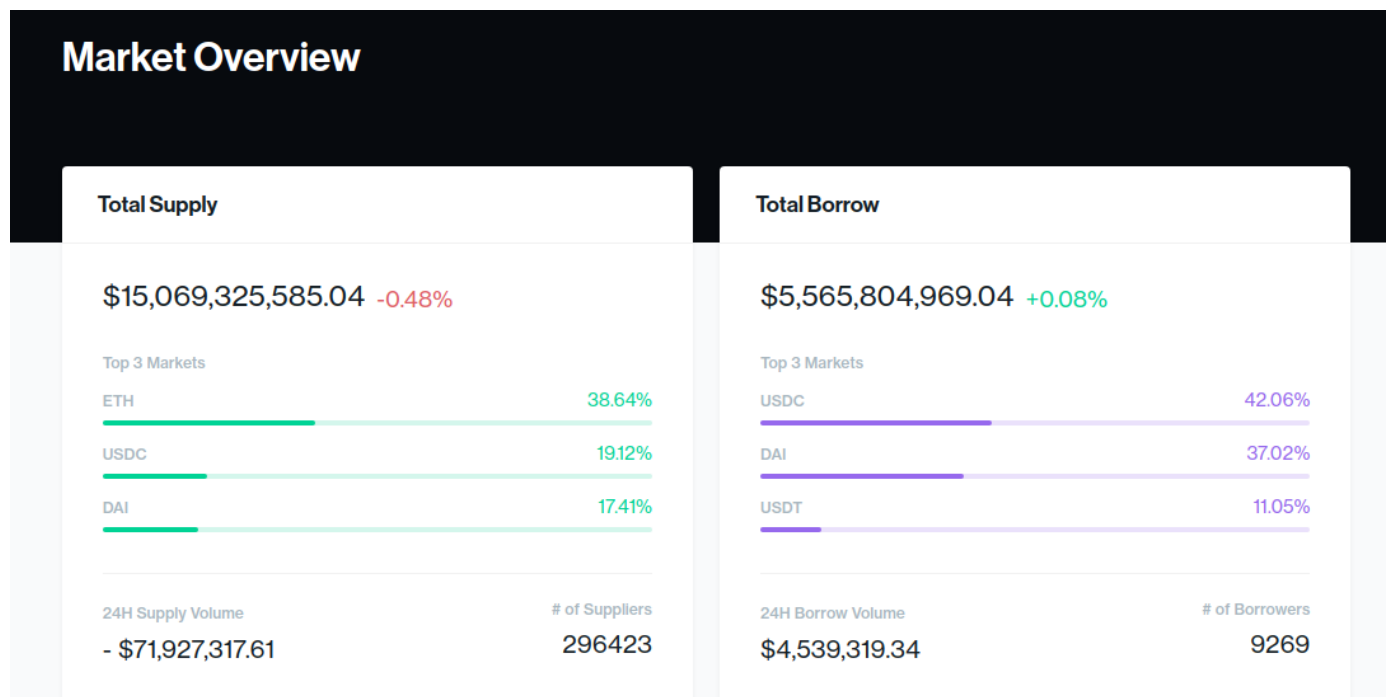
All Markets

Market		Total Supply	Supply APY	Total Borrow	Borrow APY
Ether	ETH	$5,823.25M +0.12%	0.10% –	$256.51M -2.16%	2.82% -0.01
USD Coin	USDC	$2,881.60M -1.44%	4.69% +1.34	$2,340.98M +1.25%	6.29% +1.68
Dai	DAI	$2,623.38M +0.49%	3.04% -0.04	$2,060.44M -0.17%	4.58% -0.03
Wrapped BTC	WBTC	$1,992.28M -1.24%	0.22% –	$135.03M +0.01%	4.10% +0.02
Tether	USDT	$750.47M -0.82%	5.47% -1.42	$615.25M -2.37%	7.28% -1.76
Uniswap	UNI	$203.92M -0.02%	0.13% –	$8.68M +0.01%	4.06% –
ChainLink Token	LINK	$183.94M –	0.48% –	$21.87M –	5.48% –
Compound Governance Token	COMP	$163.20M -1.56%	0.90% +0.02	$28.75M +0.01%	7.04% +0.08
Wrapped BTC (Legacy)	WBTC	$128.27M -0.01%	0.00% –	$39k +0.03%	2.32% –
0x	ZRX	$125.07M -0.01%	0.86% –	$19.22M +0.09%	7.76% +0.01
TrueUSD	TUSD	$98.63M –	2.89% –	$72.43M +0.01%	4.28% –
Basic Attention Token	BAT	$82.22M –	0.21% –	$5.18M –	4.47% –

Guide (https://medium.com/compound-finance/supplying-assets-to-the-compound-protocol-ec2cf5df5aa) to interacting with compound

Adding DAI to compound