

Understanding Automated Market-Makers (AMMs) in DeFi

An Automated Market-Maker (AMM) is a smart contract protocol that automatically prices and executes trades using algorithms. It uses **liquidity pools** (digital pools that pair tokens) to allow 24-hr continuous peer-to-contract trading.

Liquidity Providers are the users who deposit pairs of tokens into the liquid pool to enable trading.. They must deposit an equal financial value of both tokens when they first add liquidity. Subsequent external trades instantly change the token ratios and relative values.

- Investor deposits ETH (x) to buy USDC (y) from liquidity pool
- Price of USDC automatically adjusts upwards to maintain the constant- k
- This is built into the algorithm $x \times y = k$

ETH Investor as Liquidity Provider

'Smart contract' Liquidity pool

- Assuming ETH & USDC quantities are held initially in a 1: 1500 ratio
- As more ETH is deposited (supply) and more USDC is bought (demand) out of the pool, this ratio changes
- New ratio is now 1: <1500. As a result, the price of USDC rises relative to that of ETH

- As demand for USDC grows relative to supply, USDC price rises
- Since USDC is pegged to the USD, any additional demand for USDC automatically reduces the price of ETH relative to USD
- This means to get one ETH you need less USD and vice-versa

USDC Investor as Liquidity Provider

The price of an asset is calculated algorithmically based on the ratio of the paired tokens currently available in that specific pool. The most common mathematical model used is the "constant product formula"- $x \times y = k$. Here the quantities of ETH and USDC when multiplied must always equal a constant number k.