

Decentralized Finance

Stablecoins

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Background

Economic Models

- You're given a model
 - Represents (often simplifies) an economic process
 - Contains variables
 - Logical/Quantitative relationships between variables
- Example: **Inflation**
 - Measuring inflation requires a *behavior model*
 - Differentiate relative vs. inflation price change

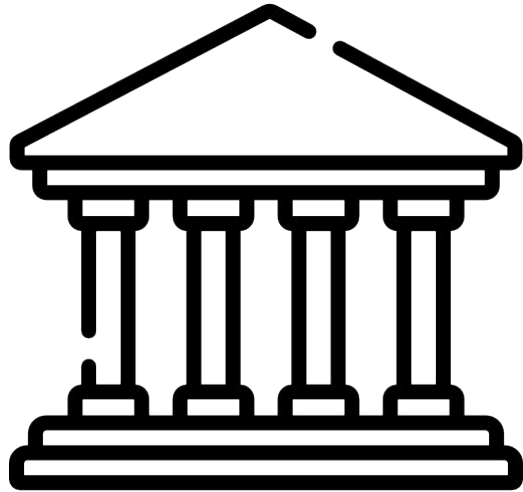
Variables in DeFi/Stablecoins

- Interest rate(s) in CeFi and in DeFi
- Cryptocurrency price
- Collateral ratio
- DeFi Protocol fees
- Blockchain Transaction fees
- Number of users
- Blockchain transaction throughput
- etc.

Exogenous vs. Endogenous

- **Exogenous Variable == outside force**
 - Determined outside the model, imposed on the model
 - **Example:** In MakerDAO, the asset price of the collateral (e.g. ETH), is independent of the MakerDAO system.
- **Endogenous Variable == inside the model**
 - Determined by the model.
 - **Example:** In Synthetix, arbitrary derivatives are backed by SNX collateral, i.e. project internal tokens.

(Fractional) Reserve



Money held by the bank

Bank's reserve ratio

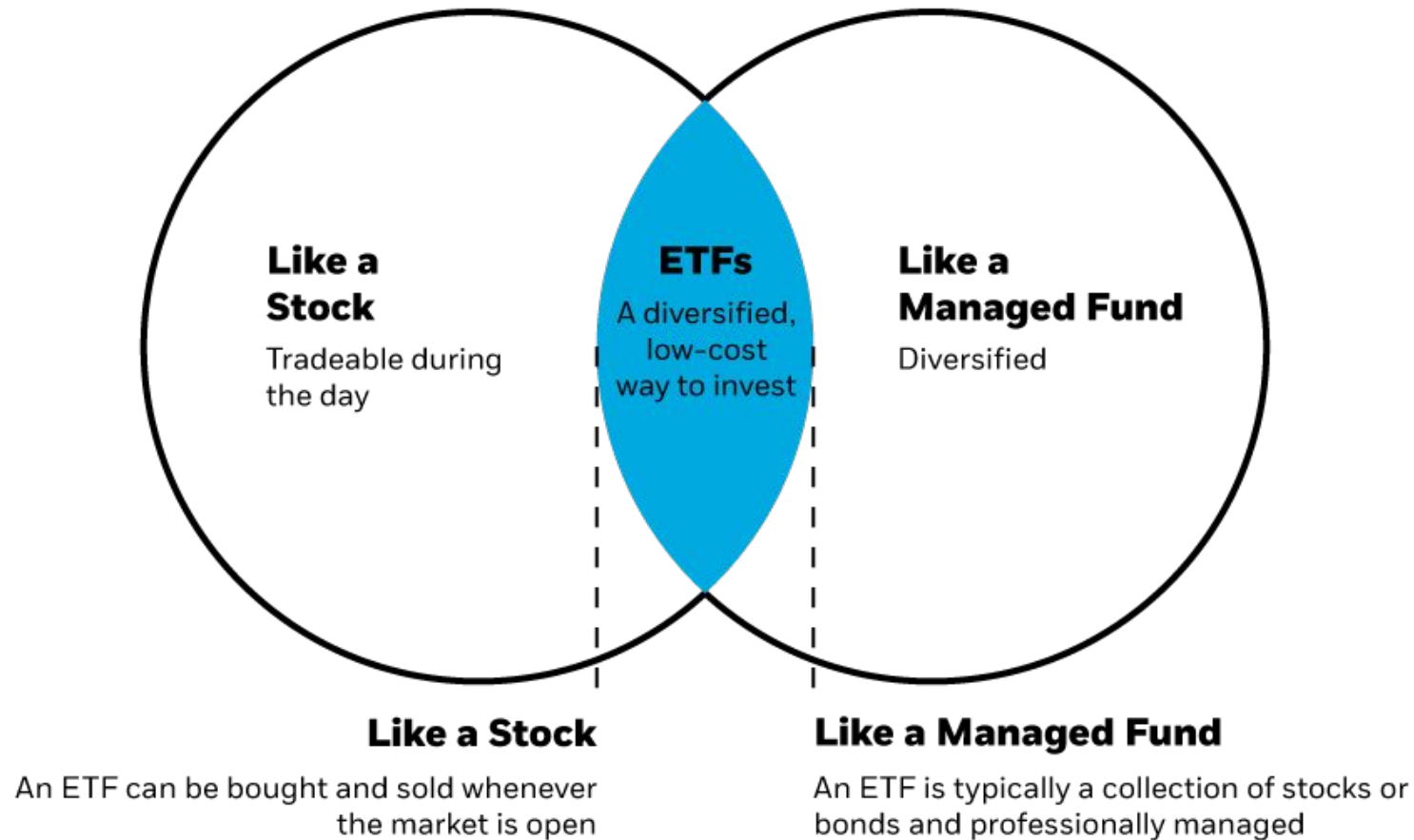
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Money deposited by bank customers



Exchange Traded Fund (ETF)



Exchange Traded Fund (ETF)

- A security/asset
 - Tracking an index/sector/commodity
 - Tradable on an exchange
 - Typically, lower fees than buying individual stocks
 - ETF types: Bond, Stock, Industry, Commodity, Currency, Inverse, etc.
- Example: SPDR S&P 500 ETF tracks the S&P 500 index



Stablecoin Basics

Why Stablecoins?

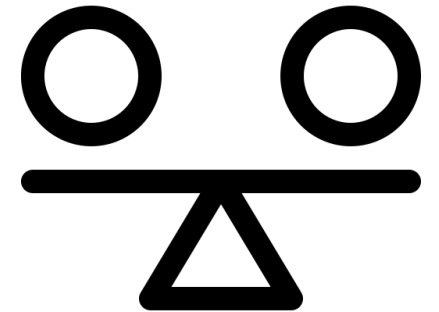
Bitcoin (BTC) Price Chart



What is “stable”?

- **Stability:**
 - ..is a relative metric
 - Volatility, standard deviation of returns
 - Worst drop over a timeframe
 - Fiat, e.g. EUR, GBP have a volatility of 6-12%

- Volatility alone does not capture the range of prices



Stable and Pegged coins



USDC



USDT



DAI

USD derivatives



WBTC



renBTC



sETH



stETH

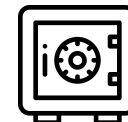
Pegged coins

- **Stablecoin Types**

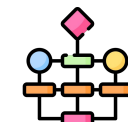
- Reserve-based



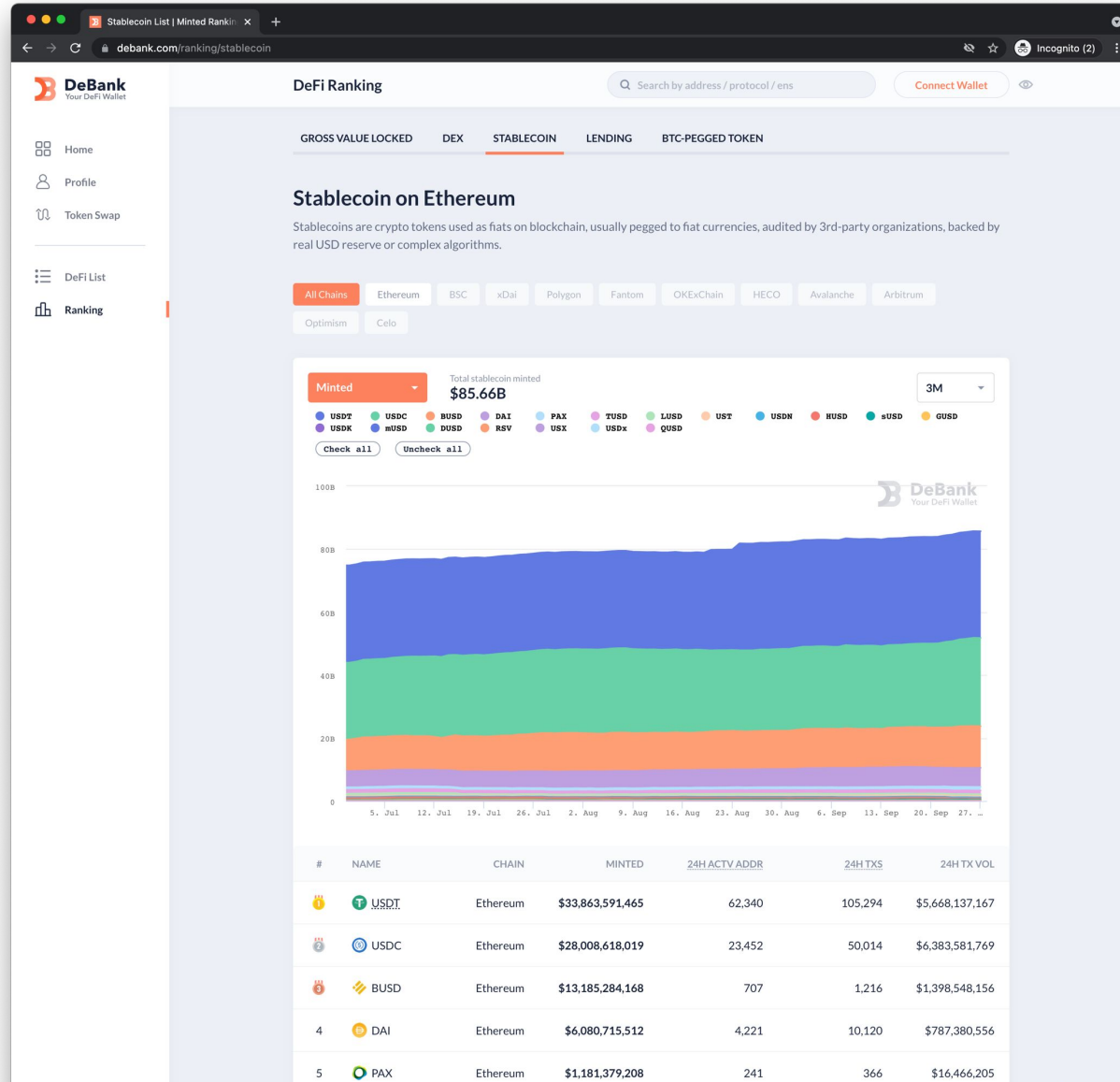
- Collateral-based



- Algorithmic



Stablecoins on Ethereum



Stable?

Inflation Calculator

If in (enter year)

I purchased an item for \$

then in (enter year)

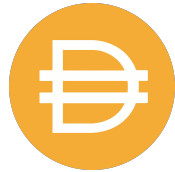
that same item would cost: **\$3.32**

Cumulative rate of inflation: **232.0%**

CALCULATE

“Stablecoins” are not “stable”, but relatively more stable than other cryptocurrencies.

How do Stablecoins work?



MakerDAO



Synthetix



AMPL



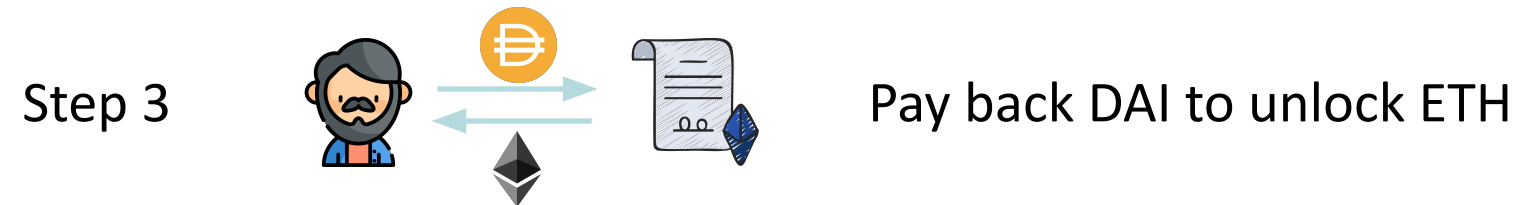
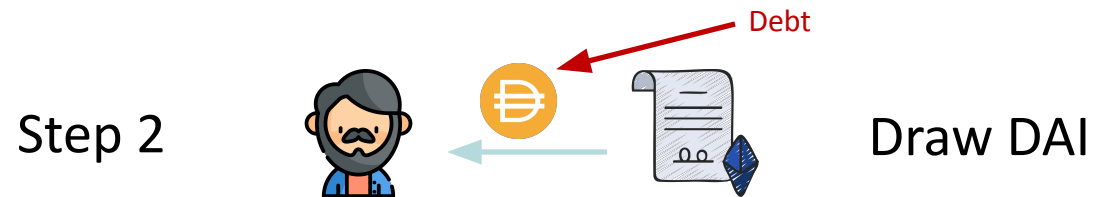
USDC



USDT

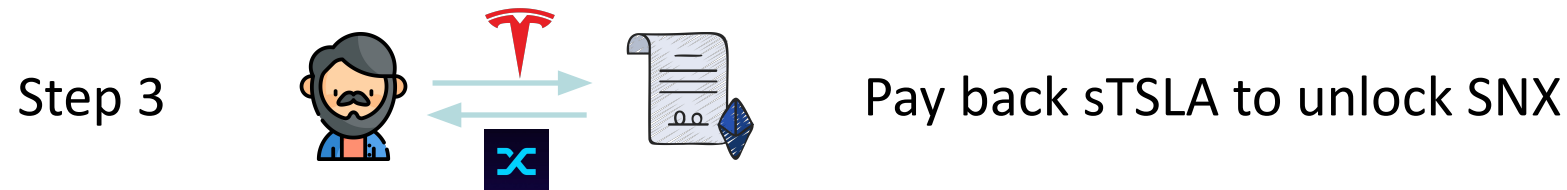
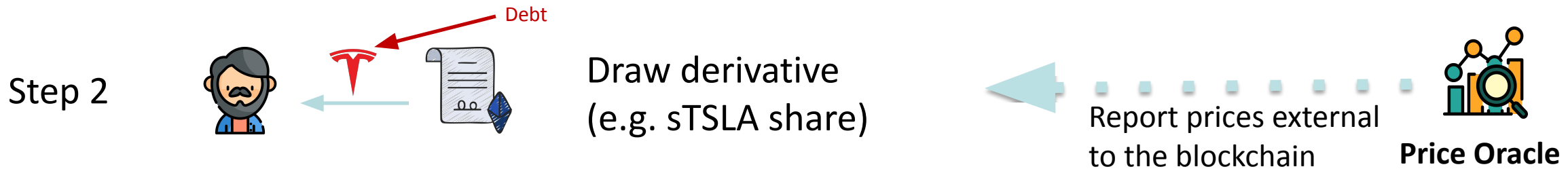
MakerDAO

Stablecoin

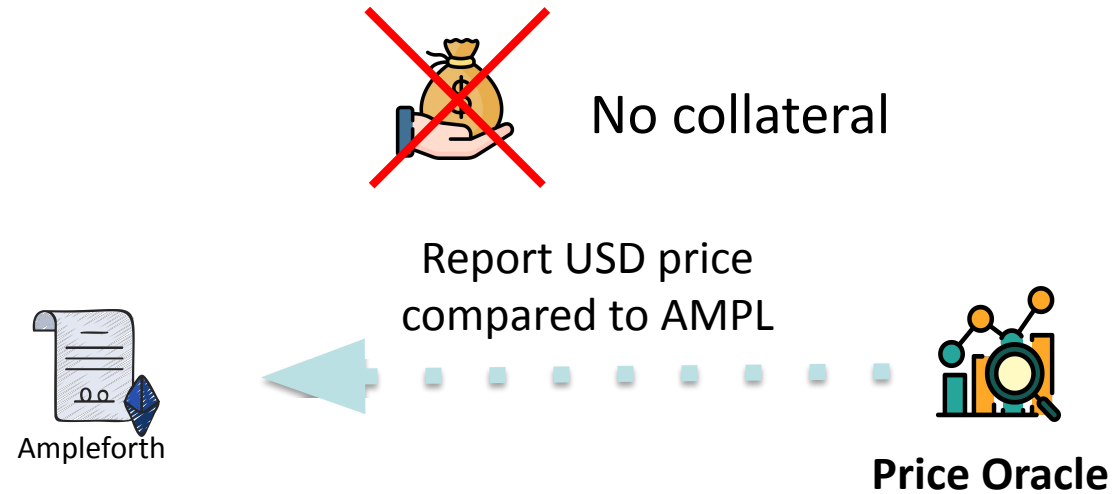


Synthetix

Mint a derivative asset



Ampleforth (AMPL)

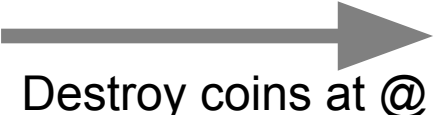
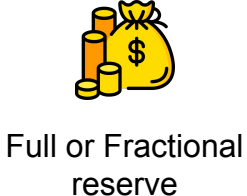


■ Three design states

- Expansion: if $1 \text{ AMPL} > 1 \text{ USD}$, add supply
- Contraction: if $1 \text{ AMPL} < 1 \text{ USD}$, remove supply
- Equilibrium: no action taken

Systemic implications!

USDC and USDT



USDT blacklisted
over 400
accounts, +44M
USDT destroyed.

USDC and USDT

```
1  function transfer(address _to, uint _value) public
    whenNotPaused {
2      require(!isBlackListed[msg.sender]);
3      if (deprecated) {
4          return UpgradedStandardToken(upgradedAddress).
              transferByLegacy(msg.sender, _to, _value);
5      } else {
6          return super.transfer(_to, _value);
7      }
8  }
9  function addBlackList (address _evilUser) public
    onlyOwner {
10     isBlackListed[_evilUser] = true;
11     AddedBlackList(_evilUser);
12 }
13 function destroyBlackFunds (address _blackListedUser)
    public onlyOwner {
14     require(isBlackListed[_blackListedUser]);
15     uint dirtyFunds = balanceOf(_blackListedUser);
16     balances[_blackListedUser] = 0;
17     _totalSupply -= dirtyFunds;
18     DestroyedBlackFunds(_blackListedUser, dirtyFunds);
19 }
```

DeFi Bank Run?

- CeFi Bank Run
 - Dangerous if fractional reserve
 - Most clients don't receive assets (or a minimum)
- DeFi Bank Run
 1. Event: USDT blacklists a pool, Stablecoin de-pegs
 2. Traders will exit pools
 3. Those who exit first receive the best prices
 4. Try to build blacklist detection bots

