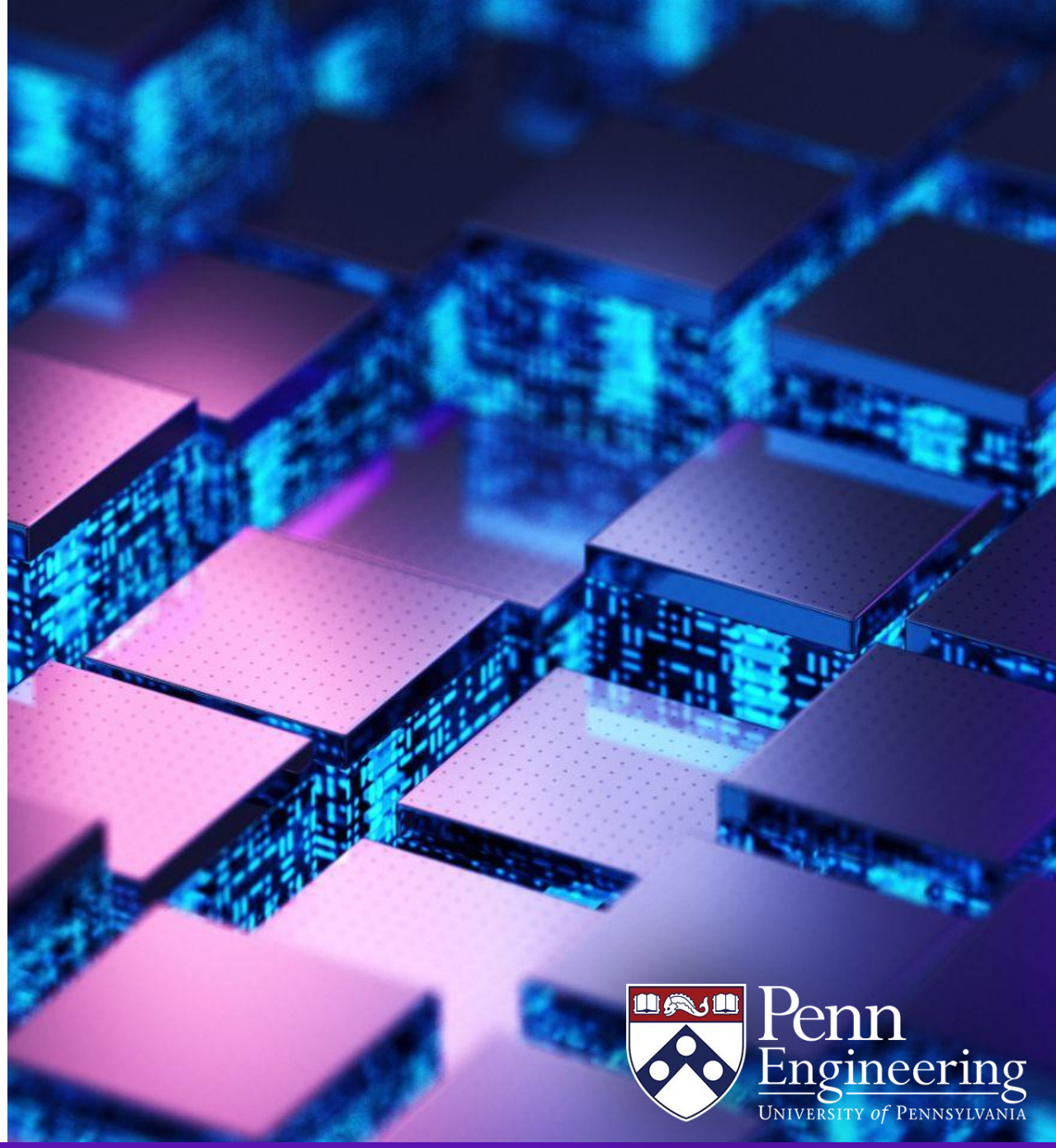
EAS 5830: BLOCKCHAINS

MakerDAO

Professor Brett Hemenway Falk

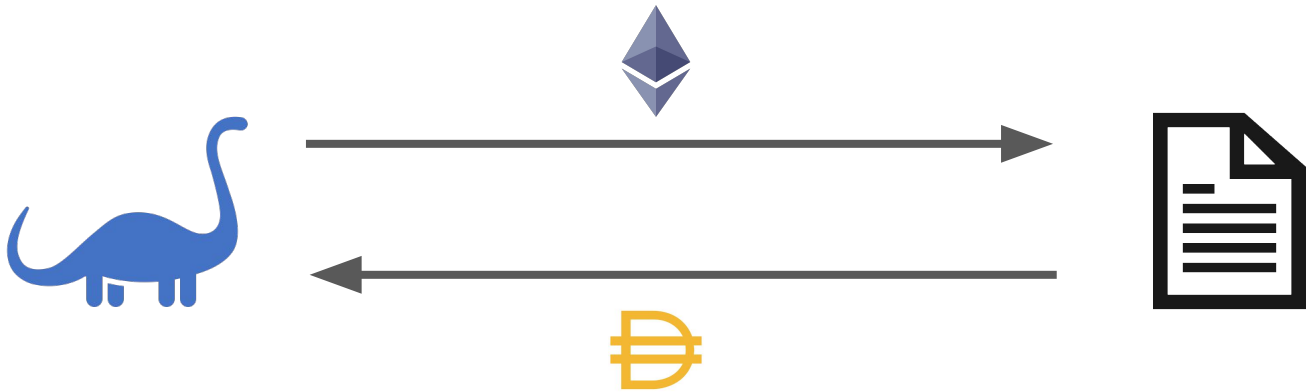


Penn Engineering
University of Pennsylvania

MakerDao tokens

- DAI
  - Stablecoin soft-pegged, 1 DAI ~ 1 USD
- MKR
  - Governance token
    - Add a new collateral asset type
    - Change the Risk Parameters
    - Modify the Dai Savings Rate
    - Choose the set of Oracle Feeds
    - Choose the set of Emergency Oracles
    - Trigger Emergency Shutdown
    - Upgrade the system

DAI

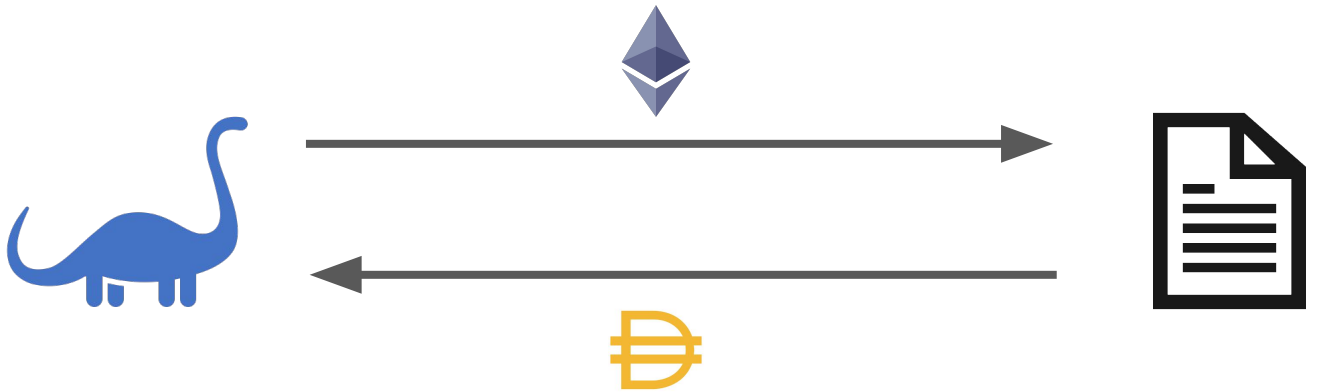


- User locks ETH in Smart Contract
- Receives a “Loan” of DAI
- $150 worth of ETH gets $100 worth of DAI

DAI

Initially, users could only lock ETH in exchange for DAI

As of 2019, MakerDao supports "Multi-Collateral DAI" (MCD)



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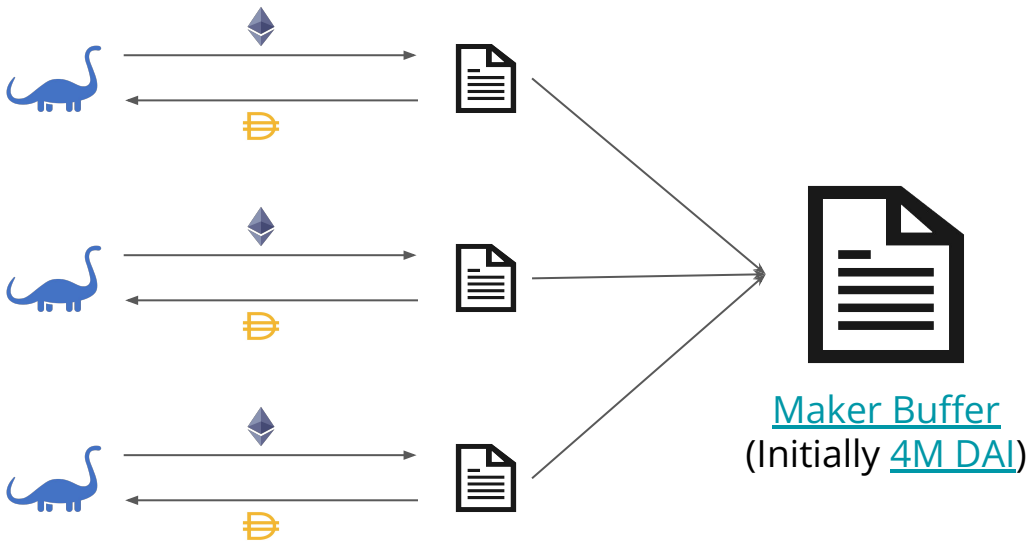
MakerDAI

Maker Buffer receives stability fees (paid in DAI)



Maker Buffer
(Initially 4M DAI)

Stability fees (paid in DAI)

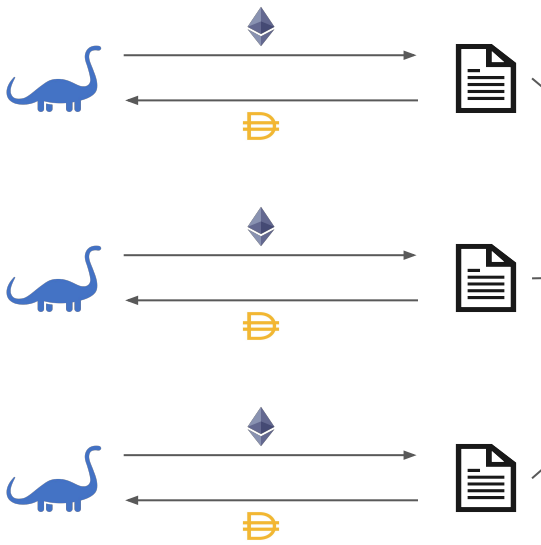
Users lock ETH in "vaults" in exchange for DAI

Collateral Auction

Debt Auction

Surplus Auction

MakerDAI



Users lock ETH in "vaults" in exchange for DAI

Stability fees (paid in DAI)

Maker Buffer receives stability fees (paid in DAI)

Maker Buffer (Initially 4M DAI)

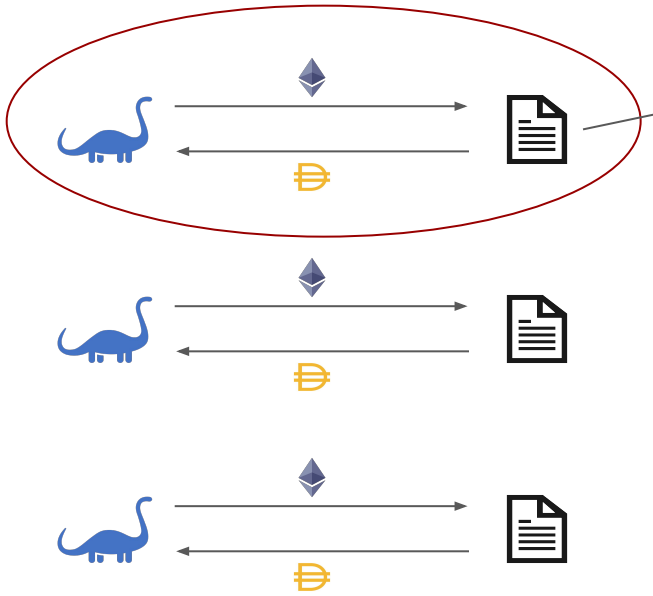
Collateral Auction

Debt Auction

Surplus Auction

Excess DAI sold for MKR (MKR burned)

MakerDAI



Users lock ETH in "vaults" in exchange for DAI

Collateral ratio drops below 1.5:1

Maker Buffer
(Initially 4M DAI)

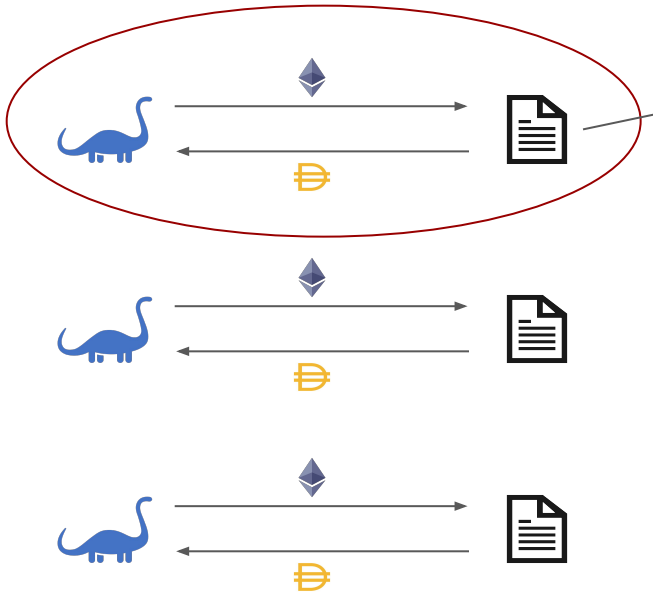
Collateral Auction

Collateral is sold for DAI

Debt Auction

Surplus Auction

MakerDAI



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Maker Buffer
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DAI is burned from Maker Buffer

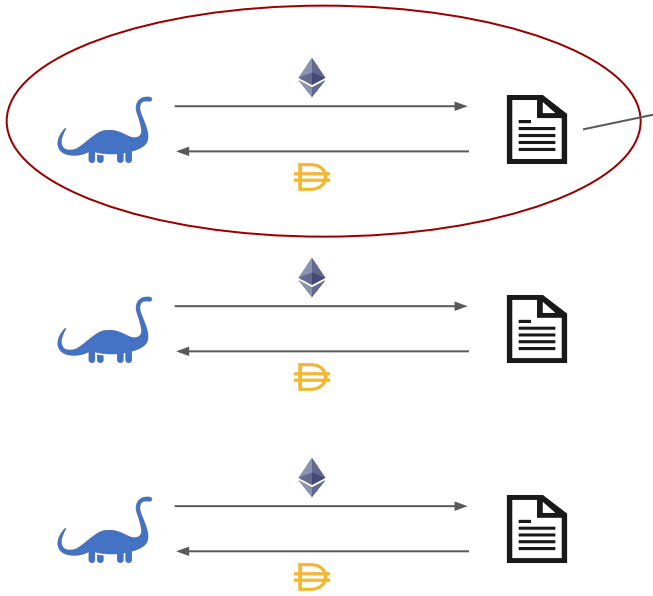
Collateral Auction

Collateral is sold for DAI

Debt Auction

Surplus Auction

MakerDAI



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(Initially 4M DAI)

DAI is burned from Maker Buffer

Collateral Auction

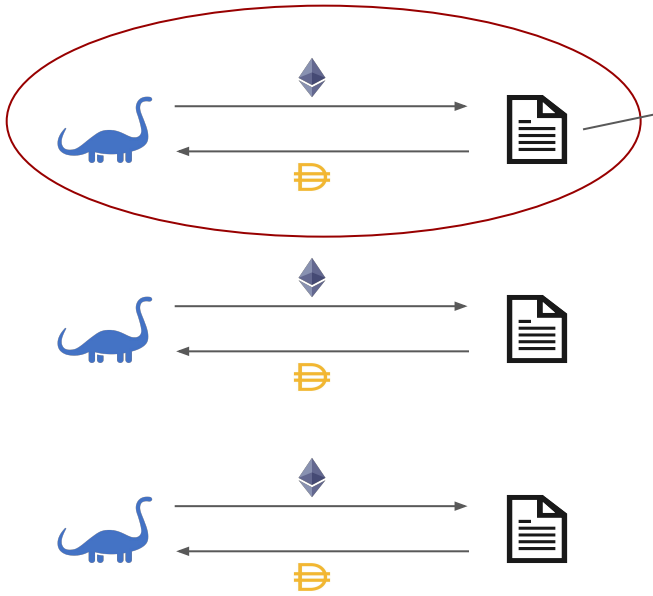
Collateral is sold for DAI

Debt Auction

MKR is minted and sold for DAI

Surplus Auction

MakerDAI



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Maker Buffer
(Initially 4M DAI)

DAI is burned from Maker Buffer

Collateral Auction

Collateral is sold for DAI

Debt Auction

MKR is minted and sold for DAI

MKR price decreases

Surplus Auction

MKR price increases

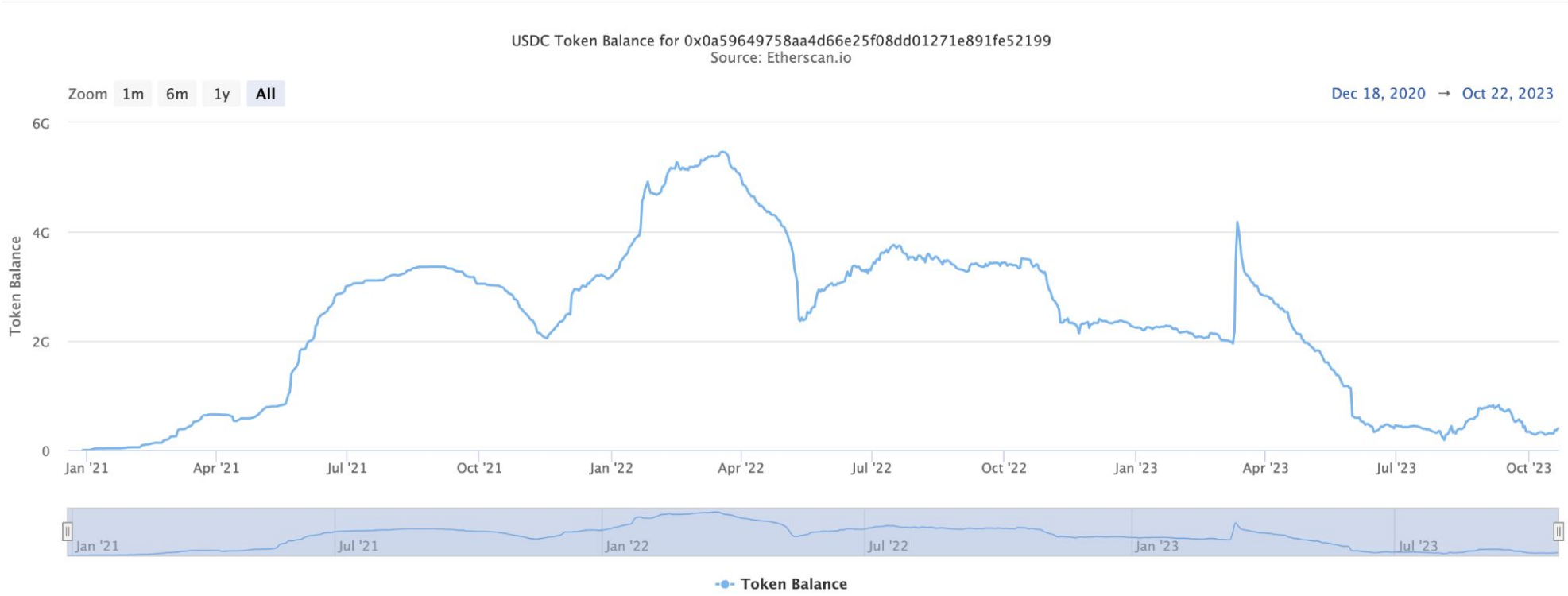
Where does price stability come from?

- If the price of DAI drops below $1, loans become more expensive
  - People should repay their loans
  - DAI is burned
  - Supply of DAI decreases
- If the price of DAI goes above $1, loans become cheaper
  - People should borrow more DAI
  - DAI is minted
  - Supply of DAI increases

Nov 18, 2019
→
Oct 16, 2023
$1.08
$1.05
$1.03
$1.00
$0.975000
$0.950000
$0.925000
$0.900000
Jan '20
Jul '20
Jan '21
Jul '21
Jan '22
Jul '22
Jan '23
Jul '23
2020
2021
2022
2023

The Peg-Stability Module

- Introduced in 2020
- Swap USDC ↔ DAI at 1:1 price



Decentralized Stablecoins and Collateral Risk

How does smart contract determine price?

- $150 ETH can borrow up to 100 DAI
- How many ETH equals $150?
- MakerDao V1
  - 14 whitelisted, anonymous pricefeed contracts
  - MakerDao contract uses median of 14 price feeds
    - Some feeds have posted prices up to 15% off median
- MakerDao V2
  - 5 “public” price-feeds added
    - 0x, dYdX, Set Protocol, and Gnosis

“MakerDAO's ideological pitch is a way for users of volatile assets to hedge against inflation. Turns out that's not really the use. It's actually for large ETH whales to go long on ETH and use the DAI to buy more ETH.”

“The main use case for collateralized loans is investment leverage.”

DAI as leverage

Scenario I

- User invests $150 in ETH
- Price of ETH doubles
- User sells, and has $300

Scenario II

- User invests $150 in ETH
- User Locks ETH in MakerDao and Receives $100 in DAI
- User buys ETH using DAI
- Price of ETH doubles
- User purchases DAI with ETH, and redeems original ETH
- User has $400 (less interest)

With a debt to equity ratio of ⅔, users can realize 4/3 of the gains when ETH increases in price

DAI as leverage

Scenario II

- User invests $150 in ETH
- User Locks ETH in MakerDao and Receives $100 in DAI
- User buys ETH using DAI
- Price of ETH doubles
- User purchases DAI with ETH, and redeems original ETH
- User has $400 (less interest)

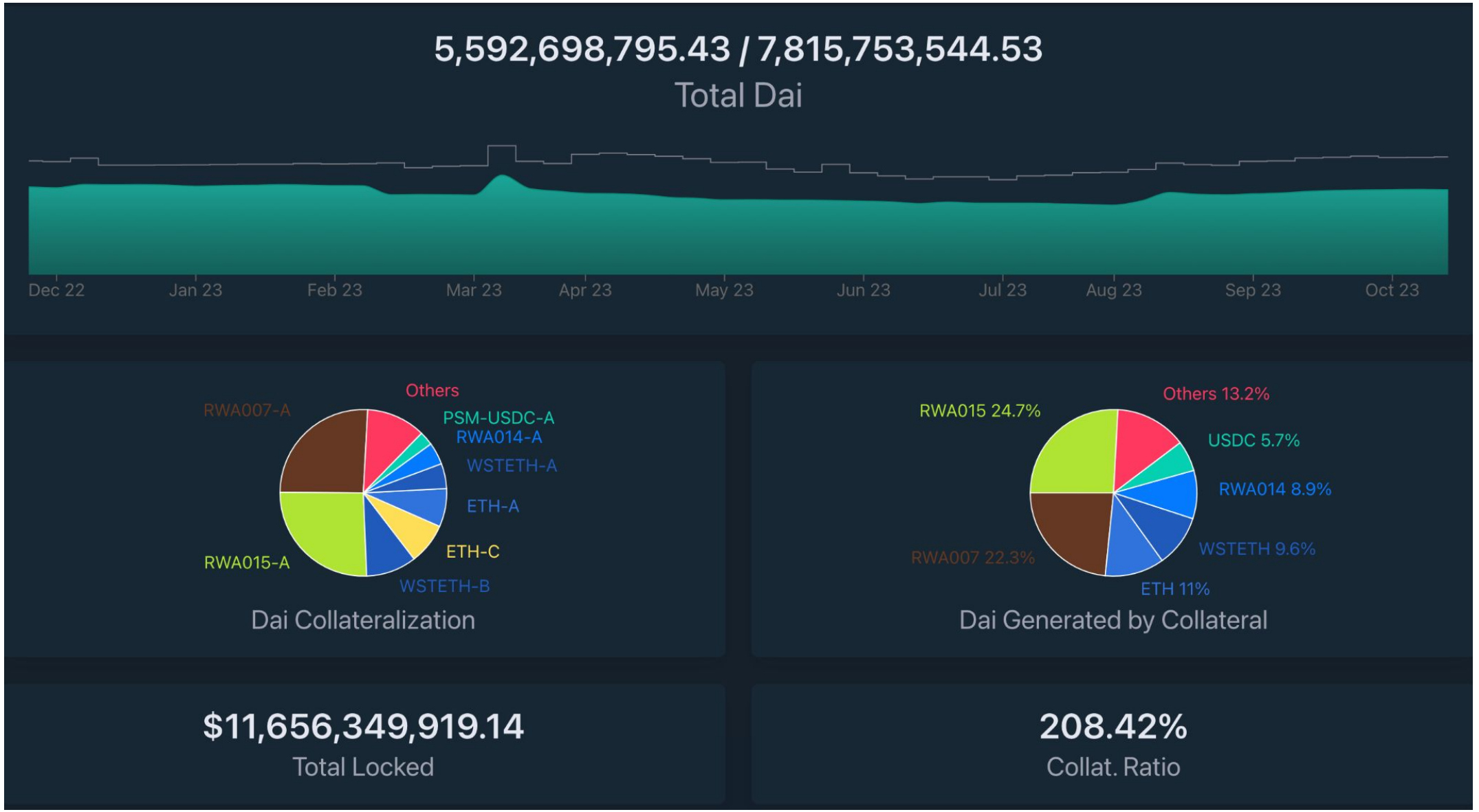
Scenario III

- User invests $150 in ETH
- User Locks ETH in MakerDao and Receives $100 in DAI
- User buys ETH using DAI
- User invests this ETH in DAI
  - Repeats indefinitely
- Price of ETH doubles
- User purchases DAI with ETH, and redeems original ETH
- User has $600 (less interest)

With a debt to equity ratio of ⅔, users can realize 2x times the gains when ETH increases in price

Crypto's New Darling Is Ready to Deploy $6 Billion in Treasuries

- MakerDAO can now invest up to $6 billion in Treasuary Bills
- The project's MKR is 2023's best-performing major token


5,592,698,795.43 / 7,815,753,544.53
Total Dai
Dec 22
Jan 23
Feb 23
Mar 23
Apr 23
May 23
Jun 23
Jul 23
Aug 23
Sep 23
Oct 23
Others
RWA007-A
PSM-USDC-A
RWA014-A
WSTETH-A
ETH-A
ETH-C
RWA015-A
WSTETH-B
Dai Collateralization
Others 13.2%
RWA015 24.7%
USDC 5.7%
RWA014 8.9%
WSTETH 9.6%
RWA007 22.3%
ETH 11%
Dai Generated by Collateral
$11,656,349,919.14
Total Locked
208.42%
Collat. Ratio