

Course III:

DeFi Deep Dive

1. Credit and Lending

(i) MakerDAO

(b) Liquidation

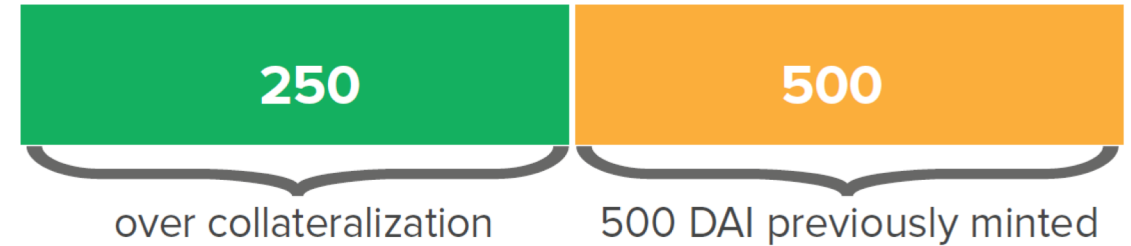
Credit/Lending: Scenario 2

MakerDAO

- Suppose the value of the ETH drops by 25% from \$200 to \$150.
- In this case, the value of the collateral drops to \$750 and the collateralization ratio drops to 1.5 ($\$750/1.5 = 500$).

ETH depreciates 25% \$200 → \$150

VALUE of COLLATERAL (5 ETH) = \$750



collateralization factor: **150%**

maximum loan: **750/1.5 = 500 DAI**

actual loan: **500 DAI** → (ratio now 150%)

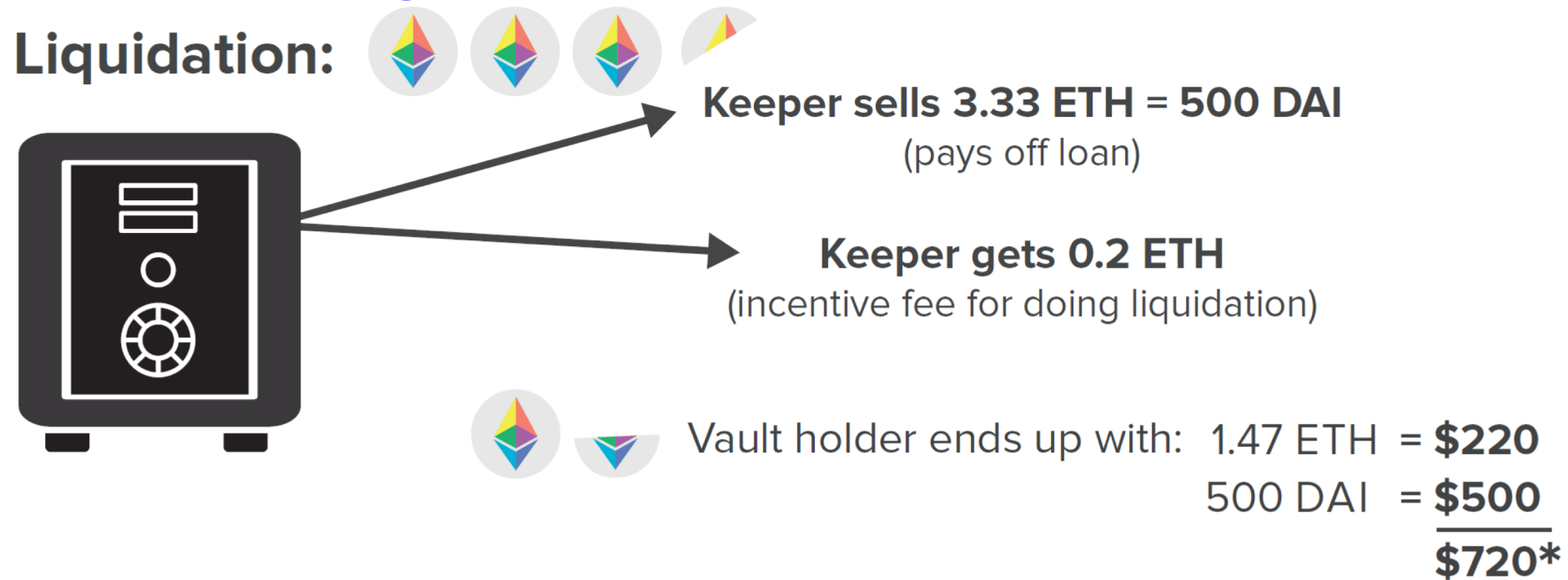
Credit/Lending: MakerDAO

Example

Suppose the value of the ETH drops by 25% from \$200 to \$150.

- The Vault holder faces three scenarios.
 1. She can increase the amount of collateral in the contract (by, for example, adding 1 ETH).
 2. She can use the 500 DAI to pay back the loan and repatriate the 5 ETH. These ETH are now worth \$250 less, but the depreciation in value would have happened irrespective of the loan.
 3. The loan is liquidated by a *keeper* (any external actor).

Credit/Lending: MakerDAO



** Abstracts from gas fees*

- The keeper auctions the ETH for enough DAI to pay off the loan.
- 3.33 ETH are sold and 1.47 ETH returned to the Vault holder.
- Keeper gets incentive fee of 0.2 ETH
- Vault holder has 500 DAI worth \$500 and 1.47 ETH worth \$220.

Credit/Lending: MakerDAO

Stability forces

- Two forces in this process reinforce the stability of DAI.
 1. Overcollateralization.
 2. Market actions. In the liquidation, ETH are sold and DAI are purchased, which exerts positive price pressure on DAI.

Credit/Lending: MakerDAO

Maintaining the Peg

- The viability of the MakerDAO ecosystem critically depends on DAI maintaining a 1:1 peg to the USD.
- Various mechanisms are in place to incentivize demand and supply in order to drive the price toward the peg.
- The primary mechanisms are: the debt ceiling, stability fee, and DAI Savings Rate (DSR).
- These parameters are controlled by holders of the governance token Maker (MKR) and MakerDAO governance.



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Stability fee

- The Stability Fee is a variable interest rate paid in DAI by Vault holders on any DAI debt they generate.
- The interest rate can be raised or lowered (even to a negative value) to incentivize the generation or repayment of DAI to drive its price toward the peg.

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DAI Savings Rate (DSR)

- The Stability Fee funds the DSR, a variable rate any DAI holder can earn on their DAI deposit.
- The DSR compounds on a per-block basis. The Stability Fee, which must always be greater or equal to the DSR, is enforced by the smart contracts powering the platform.

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DAI Debt Ceiling

- Lastly, a smart contract–enforced DAI debt ceiling can be adjusted to allow for more or less supply to meet the current level of demand.
- If the protocol is at the debt ceiling, no new DAI is able to be minted in new Vaults until the old debt is paid or the ceiling is raised.

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Liquidation

- When a position is deemed to be under the liquidation ratio, a keeper can initiate an auction (sell some of the ETH collateral) to liquidate the position and close the Vault holder's debt.
- The *Liquidation Penalty* is calculated as a percentage of the debt and is deducted from the collateral in addition to the amount needed to close the position.

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Large drops in the value of collateral

- If the collateral drops so far in value that the DAI debt cannot be fully repaid, the position is closed, and the protocol accrues what is known as *Protocol Debt*.
- A buffer pool of DAI exists to cover Protocol Debt, but in certain circumstances the debt can be too great for even the buffer pool to cover.
- The solution involves the governance token MKR and the governance system.