Part III:

DeFi Deep Dive

3. Derivatives

(i) Yield Protocol

(a) What is Yield Protocol?

Derivatives: Yield protocol

What is Yield protocol?

- Yield Protocol proposes a derivative model for secured, zero-coupon bonds. This enables fixed rate borrowing.
- Essentially, the protocol defines a *yToken* to be an ERC-20 (fungible) token that settles in some fixed quantity of a target asset at a specified date.
- The contract will specify that the tokens, which have the same expiry, target asset, collateral asset, and collateralization ratio, are fungible.

The Yield Protocol: On-Chain Lending With Interest Rate Discovery

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WORKING DRAFT, rev. 1

Abstract

This paper presents a sketch of a new building block for decentralized finance: yTokens. yTokens are like zero-coupon bonds: on-chain obligations that settle on a specific future date based on the price of some target asset, and are secured by collateral in another asset. By buying or selling yTokens, users can synthetically lend or borrow the target asset for a fixed term. yTokens are fungible and trade at a floating price, which means their "interest rates" are determined by the market. The prices of yTokens of varying maturities can be used to infer interest rates, and even to construct a yield curve. Depending on the target asset, yTokens can settle through "cash-settlement" using an on-chain price oracle, through "physical settlement" in the target ERC20 token, or by synthetically issuing or borrowing the target ERC20 token on another platform.

Derivatives: Yield protocol

Motivation

- Suppose you believe that ETH will appreciate by 10% over the next year.
- You could deposit ETH in Maker, borrow DAI at 3%, and reinvest in ETH.
- If ETH goes up by 10%, you would make 7%
- However, what happens if the variable borrow rate in Maker goes up to 10%? Your profit would be wiped out? This motivates a fixed rate borrow protocol

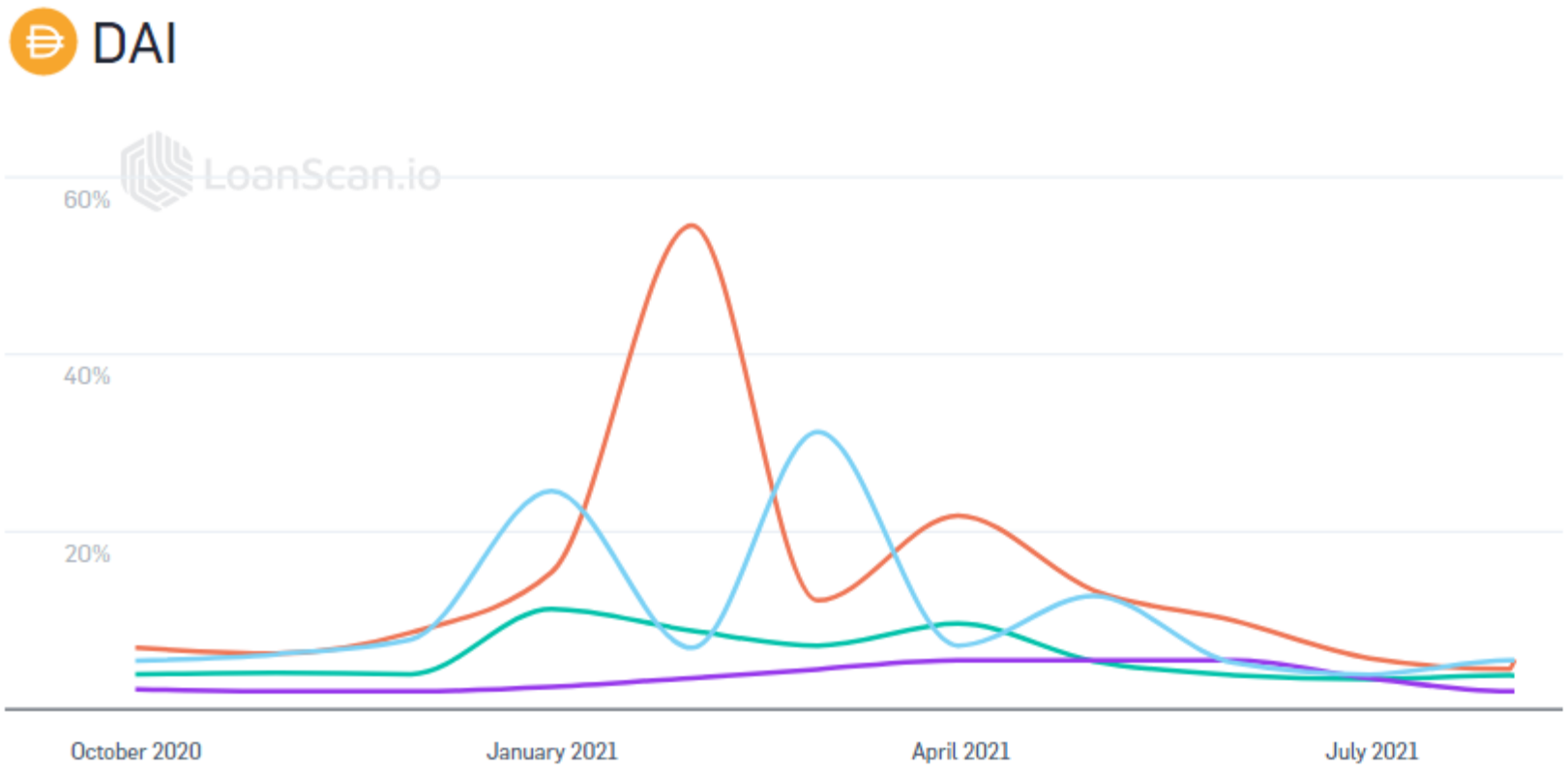
Derivatives: Yield protocol

Dai Cryptocurrency Lending Rates

Provider	Interest	30D Avg Rate	Range	Est. Interest Owed
dYdX	4.15%	7.41%		4.23 DAI
Compound	4.05%	4.28%		4.14 DAI

https://defirate.com/dai/

Derivatives: Yield protocol



PLATFORMS	
Compound	3.79% APY
dYdX	5.61% APY
Maker MCD (from ETH)	2.00% APY
Aave	5.52% APY

https://loanscan.io/borrow/historical?interval=1y

Derivatives: Yield protocol

What is Yield protocol?

- The tokens are secured by the collateral asset and have a required maintenance collateralization ratio similar to, for example, MakerDAO, as well as to other DeFi platforms we have discussed.
- If the collateral's value dips below the maintenance requirement, the position can be liquidated by a keeper with some or all of the collateral sold to cover the debt.

Part III:

DeFi Deep Dive

3. Derivatives

(i) Yield Protocol

(b) Mechanics

Derivatives: Yield protocol

Example

- The yToken effectively allows for fixed-rate borrowing and lending, using the implied return on the discounted price of the token versus the target amount.

Derivatives: Yield protocol

Example

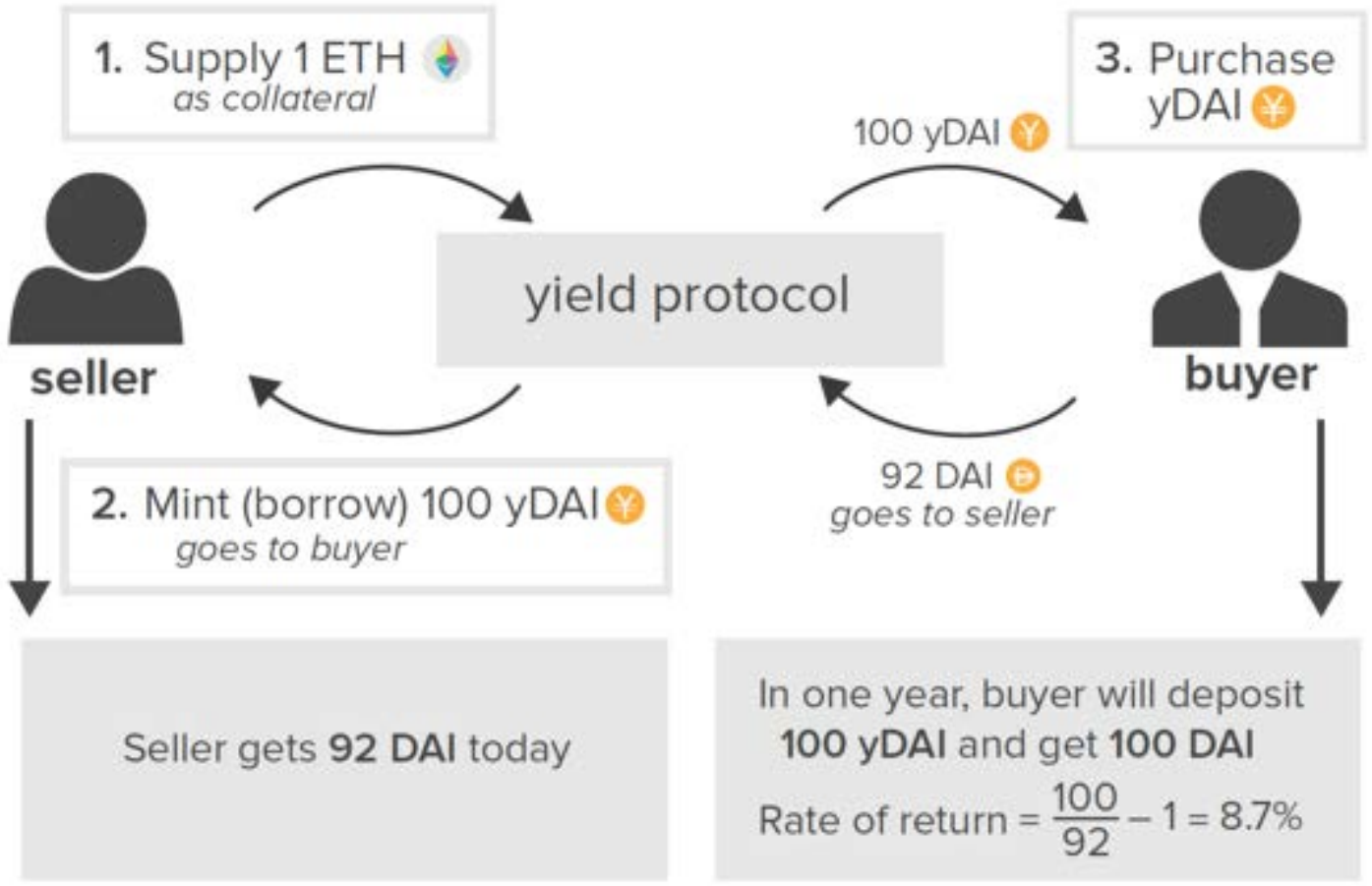
- We can illustrate as follows: assume a user has a yToken with the target asset of 1 DAI backed by ETH. The maturity date is one year ahead and the yToken is trading at 0.92 DAI. A purchase of the yToken effectively secures an 8.7% fixed interest rate, even in the case of a liquidation [(0.08/0.92) -1].
- In the event of a normal liquidation, the collateral would be sold to cover the position, as shown in the Exhibit.

Derivatives: Yield protocol

1 ETH = 200 DAI
collateralization ratio: **125%**

Example

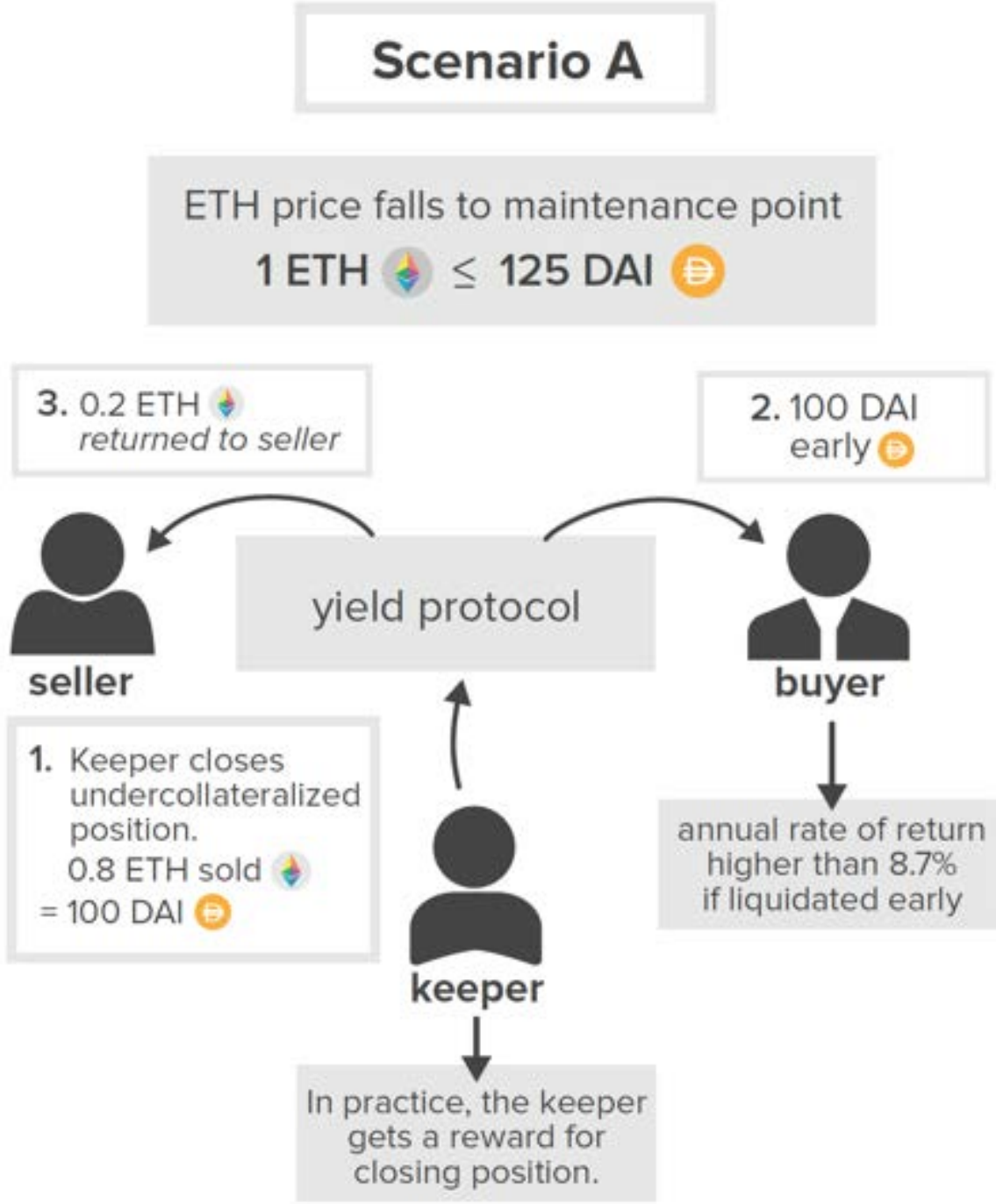
- The buyer of yDAI locks in a 8.7% return
- The borrower locks in a fixed rate loan at 8.7%.
- The borrower can use the 92 DAI to buy additional ETH.



Derivatives: Yield protocol

Example

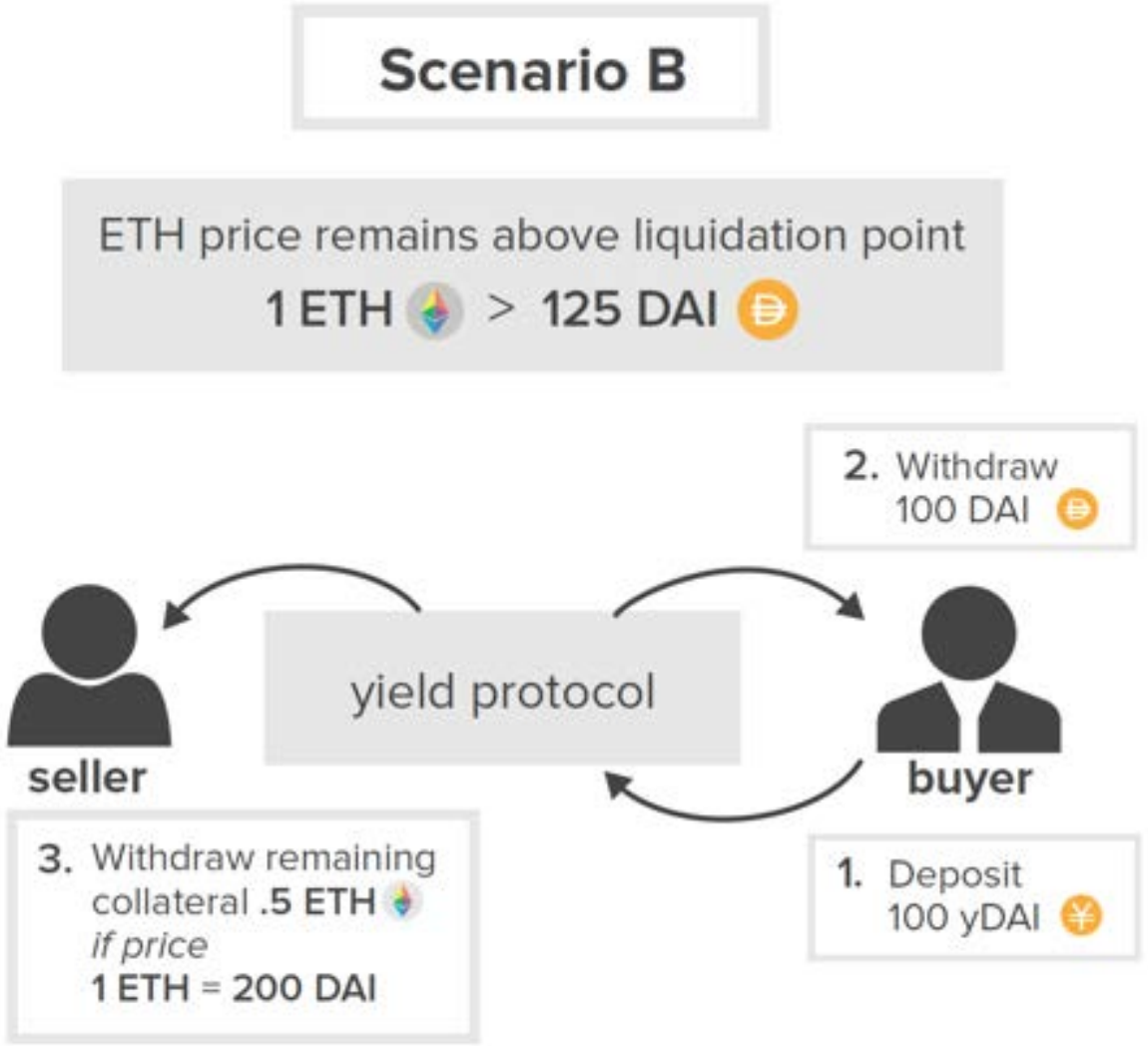
- Keeper triggers liquidation if ETH price falls below maintenance point
- Buyer gets full 8.7% return – even if liquidation happens after one month
- Borrower gets 0.2 ETH back ($25) + 92 DAI (borrowed earlier) so the cost is 8.7% there is also keeper reward



Derivatives: Yield protocol

Example

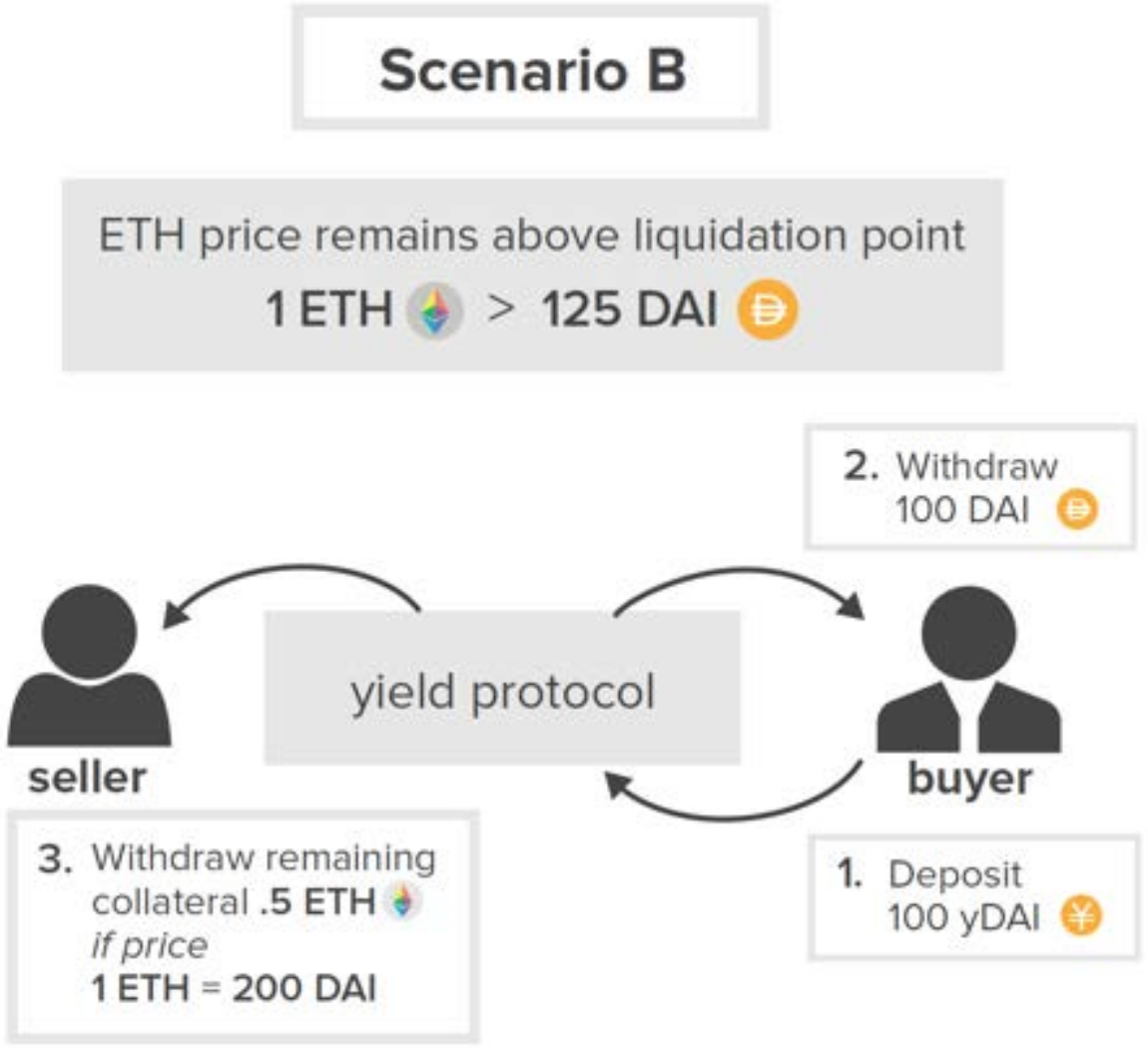
- Suppose ETH holds value at 200 DAI (no liquidation)
- 0.5 ETH used to buy 100 DAI which is transferred to buyer (who makes 8.7%)
- Seller/borrower gets the original 92 DAI plus the excess collateral (0.5 ETH worth $100)



Derivatives: Yield protocol

Example

- The seller/borrower does well if the value of ETH increases
- If the seller/borrower uses the 92 DAI to buy more ETH, the price of ETH needs to increase by at least 8.7% divided by the collateralization ratio



https://medium.com/financial-narratives/understanding-the-yield-protocol-6e4ecc688bec

Derivatives: Yield protocol

Yield curves

- The yTokens also allow for the construction of yield curves by analyzing the implied yields of short and longer term contracts.
- This can allow observers to get insights into investor sentiment among the various supported target assets.

Derivatives: Yield protocol

Betting on rates

- The Yield Protocol can be used to speculate on interest rates.
- There exist a few DAI derivative assets that represent a variable interest rate (Compound cDAI, Aave aDAI, Chai).
- One can imagine a seller of yDAI using one of these DAI derivative assets as collateral. The effect of this transaction is that the seller is paying the fixed rate on the yDAI while receiving the variable rate on the collateral. This is a bet that rates will increase.
- Likewise purchasing yDAI (of any collateral type) is a bet that variable rates will NOT increase beyond the fixed rate received.

Derivatives: Yield protocol

Summary

- Yield is an important protocol that supplies fixed rate products to Ethereum.
- It can be tightly integrated with other protocols like MakerDAO and Compound to create robust interest-bearing applications for investors.
- Demand for fixed income components will grow as mainstream investors begin adopting DeFi with portfolios in need of these types of assets.

Derivatives: Yield protocol

Traditional Finance Problem	**Yield Solution**
Centralized Control: Fixed income instruments largely restricted to governments and large corporations.	Yield protocol is open to parties of any size.
Limited Access: Many investors have limited access to buy or sell sophisticated fixed income investments.	Yield allows any market participant to buy or sell a fixed income asset that settles in a target asset of their choosing.
Inefficiency: Fixed income rates are lower due to layers of fat in traditional finance.	Lean infrastructure running on Ethereum allows for more competitive rates and diverse liquidity pools.
Lack of Interoperability: Fixed income instruments generally settle in cash which the investor must determine how to allocate.	yTokens can settle in any Ethereum target asset and even settle synthetically into a floating-rate lending protocol to preserve returns.
Opacity: Risk and uncertainty of counterparty in traditional agreements.	Clear collateralization publicly known on Ethereum blockchain backing the investment.

Part III:

DeFi Deep Dive

3. Derivatives

(ii) dYdX

(a) What is dYdX?

Derivatives: dYdX

δY/δX

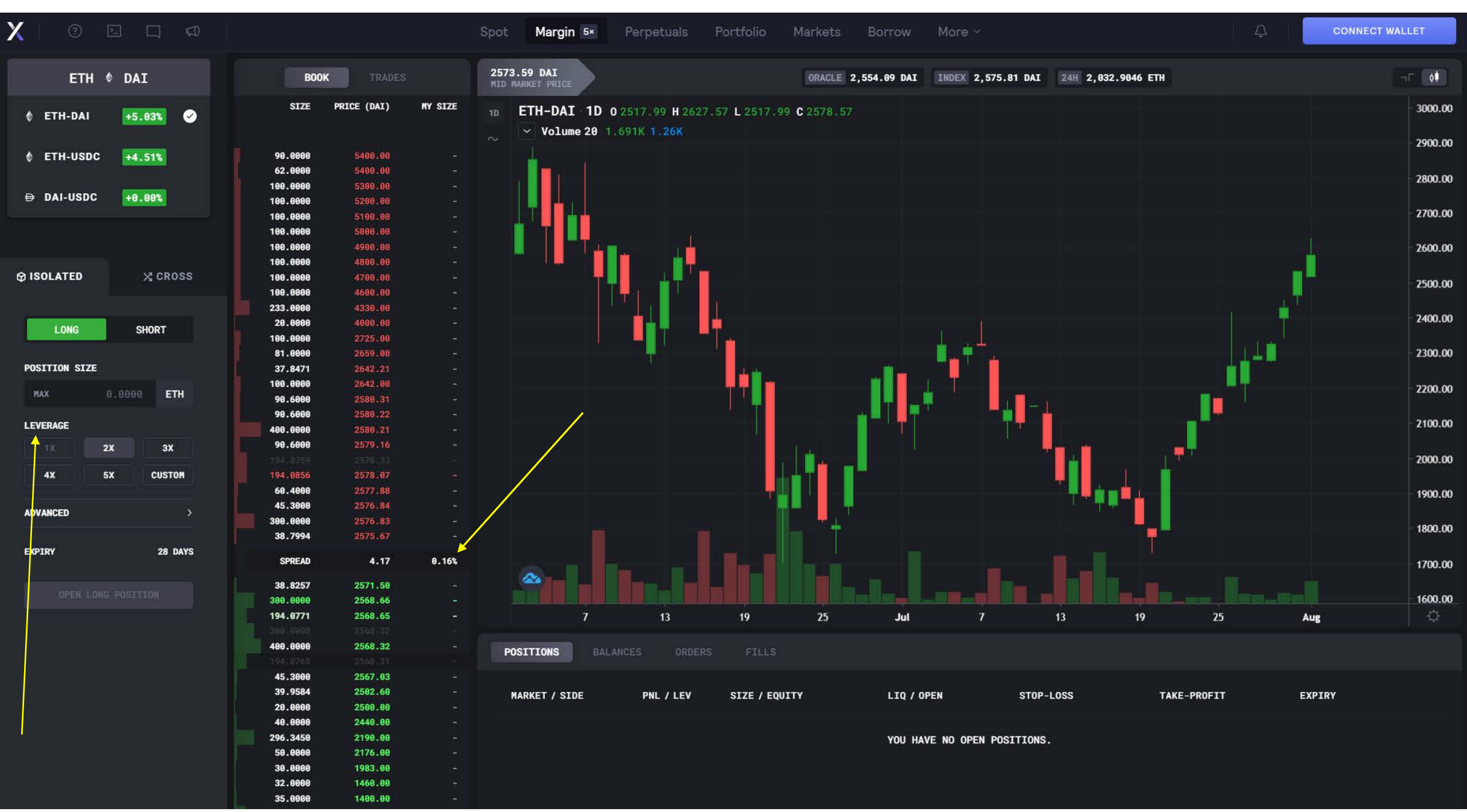
What is dYdX?

- dYdX is a company that specializes in margin trading and derivatives.
- The margin trading protocol supports USDC, DAI, and ETH.
- The company has a spot DEX that allows investors to exchange these assets against the current bid–ask on the order book.

Derivatives: dYdX

Order processing

- The DEX uses a hybrid on–off chain approach.
- Essentially dYdX stores *signed* or pre-approved orders without submitting to Ethereum.
- These orders use cryptography to guarantee they are only used to exchange funds for the desired asset at the desired price.
- The DEX supports limit orders and a *maximum slippage* parameter for market orders in an effort to mitigate the slippage associated with price moves or front running.


Spot
Margin 5×
Perpetuals
Portfolio
Markets
Borrow
More
CONNECT WALLET
ETH DAI
ETH-DAI +5.03%
ETH-USDC +4.51%
DAI-USDC +0.00%
ISOLATED
CROSS
LONG
SHORT
POSITION SIZE
MAX 0.0000 ETH
LEVERAGE
1X 2X 3X
4X 5X CUSTOM
ADVANCED
EXPIRY 28 DAYS
OPEN LONG POSITION
BOOK
TRADES
SIZE PRICE (DAI) MY SIZE
90.0000 5400.00 -
62.0000 5400.00 -
100.0000 5300.00 -
100.0000 5200.00 -
100.0000 5100.00 -
100.0000 5000.00 -
100.0000 4900.00 -
100.0000 4800.00 -
100.0000 4700.00 -
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233.0000 4330.00 -
20.0000 4000.00 -
100.0000 2725.00 -
81.0000 2659.00 -
37.8471 2642.21 -
100.0000 2642.00 -
90.6000 2580.31 -
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400.0000 2580.21 -
90.6000 2579.16 -
194.0856 2578.07 -
60.4000 2577.88 -
45.3000 2576.84 -
300.0000 2576.83 -
38.7994 2575.67 -
SPREAD 4.17 0.16%
38.8257 2571.50 -
300.0000 2568.66 -
194.0771 2568.65 -
400.0000 2568.32 -
45.3000 2567.03 -
39.9584 2502.60 -
20.0000 2500.00 -
40.0000 2440.00 -
296.3450 2190.00 -
50.0000 2176.00 -
30.0000 1983.00 -
32.0000 1460.00 -
35.0000 1400.00 -
2573.59 DAI
MID MARKET PRICE
ORACLE 2,554.09 DAI
INDEX 2,575.81 DAI
24H 2,032.9046 ETH
1D
ETH-DAI 1D O 2517.99 H 2627.57 L 2517.99 C 2578.57
Volume 20 1.691K 1.26K
3000.00
2900.00
2800.00
2700.00
2600.00
2500.00
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1800.00
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13
19
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Jul
7
13
19
25
Aug
POSITIONS
BALANCES
ORDERS
FILLS
MARKET / SIDE
PNL / LEV
SIZE / EQUITY
LIQ / OPEN
STOP-LOSS
TAKE-PROFIT
EXPIRY
YOU HAVE NO OPEN POSITIONS.

Derivatives: dYdX

Order processing

- Allowing dYdX to match the orders holds little or no risk that the company could steal user funds, because the signed orders can only be used as intended per the smart contract.
- When the orders are matched, they are submitted to the Ethereum blockchain, where the smart contract facilitates settlement.

Derivatives: dYdX

Leverage

- Levered long or short position are possible using margined collateral.
- The maximum leverage dYdX currently allows is 10 times. We will see the leverage is higher for perpetual futures.
- The positions can be isolated so that a single collateral deposit is used or cross-margined so that all of the investor's balances are pooled to serve as collateral.

Derivatives: dYdX

Keepers

- As in other protocols, dYdX has a maintenance margin requirement that if not maintained triggers liquidation of the collateral to close the position.
- The liquidations can be performed by external keepers who are paid to find and liquidate underwater positions, similar to the process followed by MakerDAO.

Derivatives: dYdX

Lending/borrowing

- dYdX offers borrowing and lending similar to Compound and Aave.
- The dYdX markets also feature flash loans.
- Unlike Aave, the flash loans are free, so that dYdX is a popular choice for DAI, ETH, and USDC flash liquidity.

Part III:

DeFi Deep Dive

3. Derivatives

(ii) dYdX

(b) Flash Loans

Derivatives: dYdX

Free flash loans

- In the world of open smart contracts, it makes sense that flash loans rates would be driven to zero given that they are near risk free.
- Lending rates are determined by the loan's duration and default risk.
- For flash loans, repayment is algorithmically enforced and time is infinitesimal: in a single transaction, only the user can make any function calls or transfers.
- No other Ethereum users can move funds or make any changes while a particular user's transaction is in flight, resulting in no opportunity cost for the capital.

Derivatives: dYdX

Flash loans and arbitrage

- A market participant offering free flash loans will attract more usage to their platform.
- Because flash loans do not require any upfront capital, they democratize access to funds for various use cases.
- In the Aave example, we showed how flash loans can be used to refinance a loan.
- We will now illustrate the use of flash loans to capitalize on an arbitrage opportunity.

Derivatives: dYdX

Example

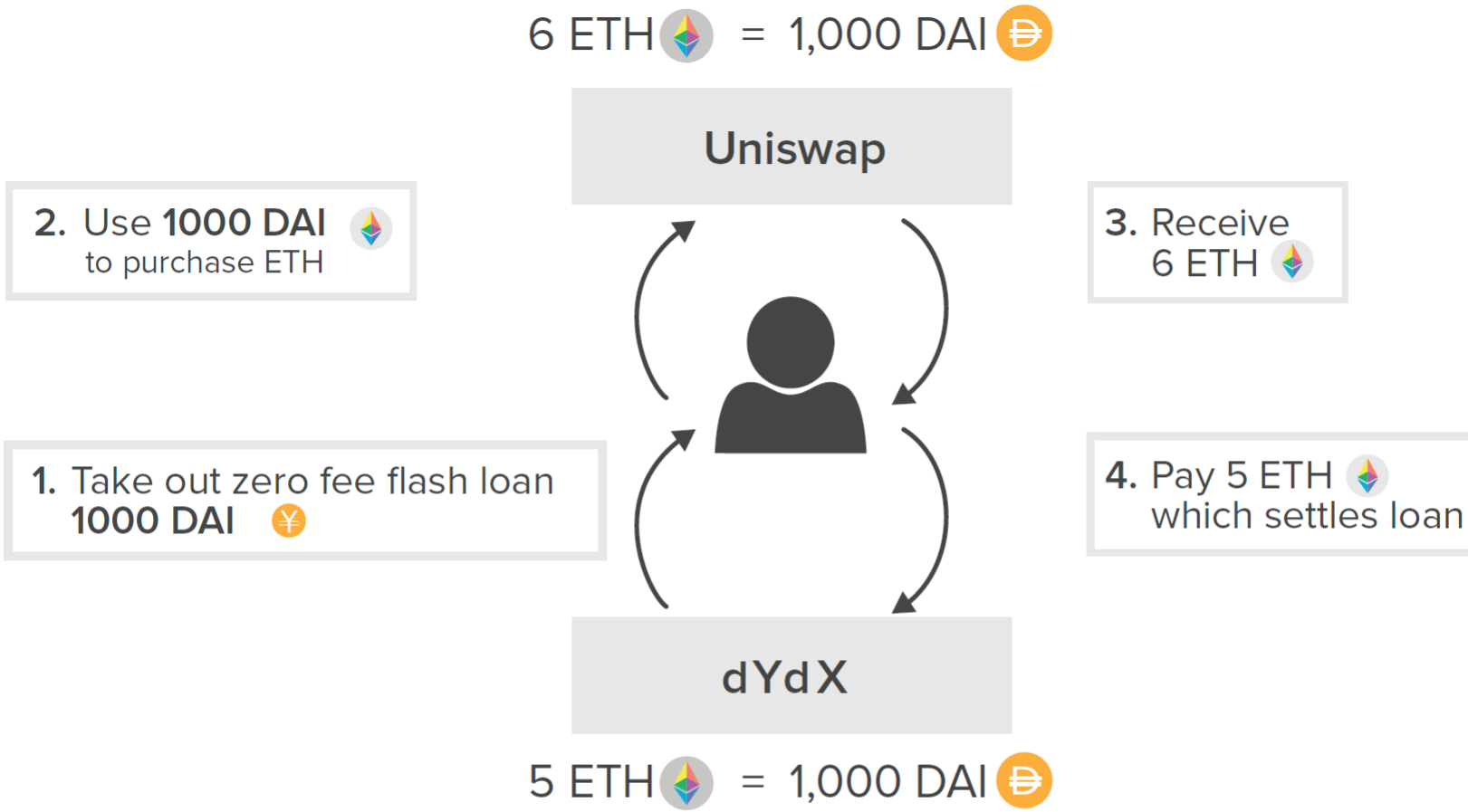
- Suppose the effective exchange rate for 1,000 DAI for ETH on Uniswap is 6 ETH/1,000 DAI. (The instantaneous exchange rate would be different, due to slippage.)
- Also, suppose the dYdX DEX has a spot ask price of 5 ETH for 1,000 DAI (i.e., the ETH are much more expensive on dYdX than Uniswap).

Derivatives: dYdX

Example

- Arbitrage opportunity, (without any capital beyond the gas fee):
  1. Execute a flash loan to borrow 1,000 DAI,
  2. Exchange it on Uniswap for 6 ETH, and
  3. Use 5 of those ETH to trade for 1,000 DAI on dYdX.
  4. Repay the flash loan with the 1,000 DAI and
  5. Pocket the 1 ETH profit.
- All of this happens in a single transaction.

Derivatives: dYdX



All of this is a single transaction, so flash loan has minimal risk.

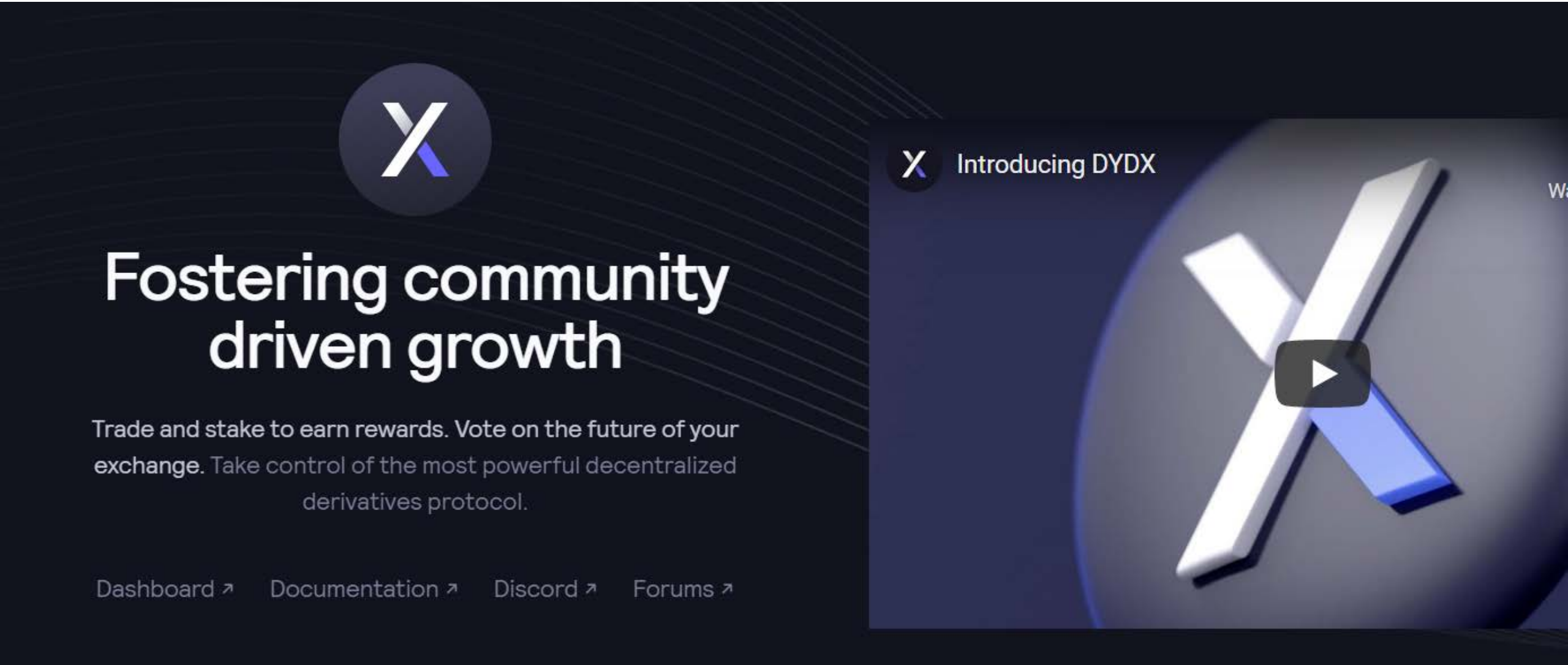
Profit = 1 ETH

(received 6 ETH from Uniswap and paid back loan with 5 ETH)

(abstracts from gas fees)

Derivatives: dYdX

August 3, 2021 dYdX launches its governance token: DYDX



Derivatives: dYdX

August 3, 2021 dYdX launches its governance token: DYDX

DYDX is a governance token that allows the dYdX community to truly govern the dYdX Layer 2 Protocol ("the protocol"). By enabling shared control of the protocol, DYDX allows traders, liquidity providers, and partners of dYdX to work collectively towards an enhanced Protocol.

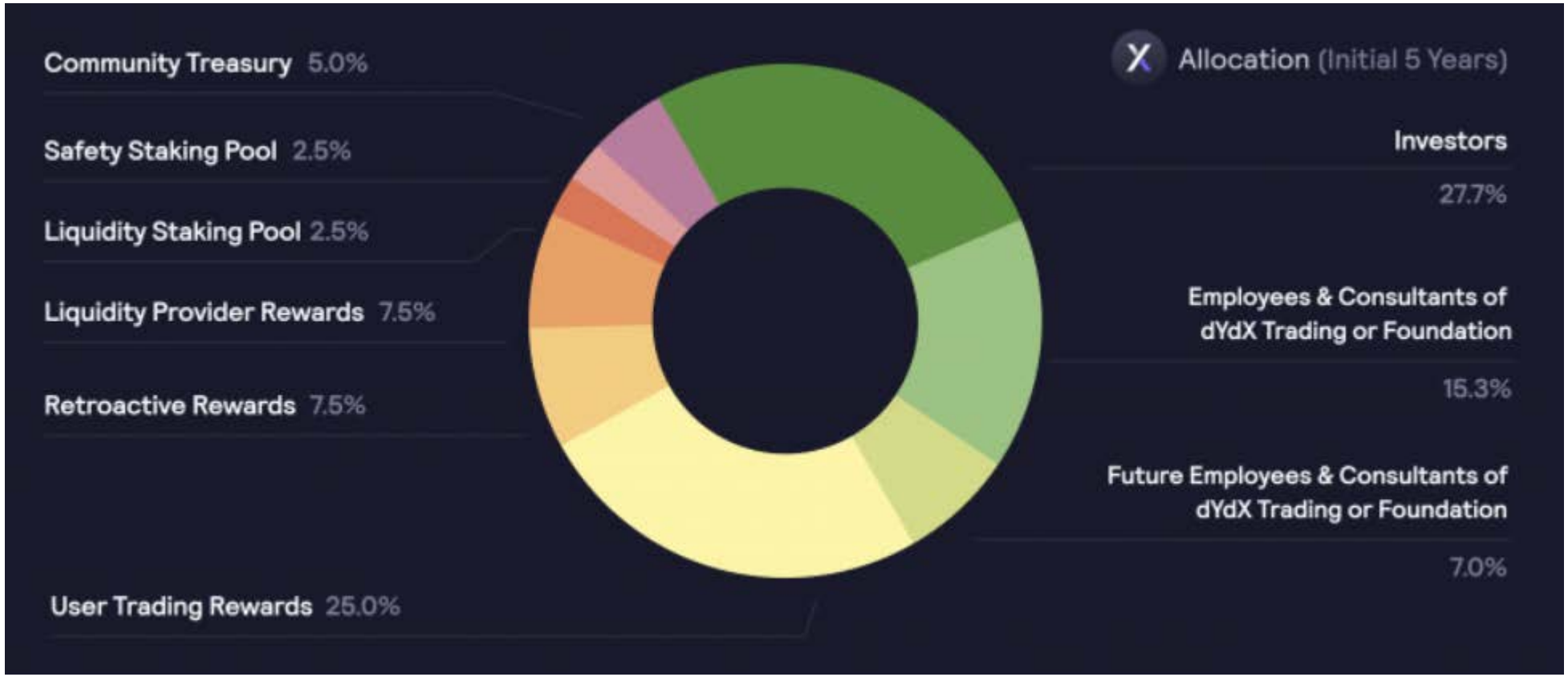
DYDX enables a robust ecosystem around governance, rewards, and staking — each designed to drive future growth and decentralization of dYdX, resulting in a better experience for users.

Staking pools are designed to promote liquidity and safety on the Protocol. Rewards programs for trading, liquidity providing, and past usage of dYdX will help drive growth and adoption of dYdX.

https://docs.dydx.community/dydx-governance/

Derivatives: dYdX

August 3, 2021 dYdX launches its governance token: DYDX



https://docs.dydx.community/dydx-governance/

Part III:

DeFi Deep Dive

3. Derivatives

(ii) dYdX

(c) Perpetual Futures

Derivatives: dYdX

Perpetual futures

- Perpetual futures are a popular derivative product similar to traditional futures but without a settlement date.
- By entering into a perpetual futures contract, the investor is simply betting on the future price of an asset.
- The contract can be long or short, with or without leverage.

https://www.paradigm.xyz/papers/everlasting_options.pdf

Derivatives: dYdX

Perpetual futures

- Perpetual futures are equivalent to a swap consisting of a portfolio of one-day forwards/futures
- Traditional markets have fixed expiration. Having a single contract reduces the chance that certain expiration dates have little liquidity

See Robert E. Whaley, *Derivatives,* for a comprehensive analysis.
https://www.amazon.com/Derivatives-Markets-Valuation-Risk-Management/dp/0471786322/ref=sr_1_2

Derivatives: dYdX

Perpetual futures

- The perpetual futures contract uses an Index Price based on the average price of the underlying asset across the major exchanges.
- BTC-USD Perpetual uses the MakerDAO BTCUSD Oracle V2, an oracle that reports in on-chain fashion the bitcoin prices from the cryptocurrency exchanges of Binance, Bitfinex, Bitstamp, Bittrex, Coinbase Pro, Gemini, and Kraken.

https://defiprime.com/perpetual-dydx

Derivatives: dYdX

Perpetual futures

- The investor deposits margin collateral and chooses a direction and amount of leverage.
- Leverage up to 25x is possible
- The contract can trade at a premium or discount to the Index Price depending on whether more traders are long or short the underlying, in this case BTC.

Derivatives: dYdX

Futures funding rate

- A funding rate, paid from one side to the other, keeps the futures price close to the Index.
- If the futures contract is trading at a premium to the Index, the funding rate would be positive, and longs would pay shorts.
- The magnitude of the funding rate is a function of the difference in price compared to the Index.
- Likewise, if the contract is trading at a discount, the shorts pay the long positions.

Derivatives: dYdX

Futures funding rate

- The funding rate incentivizes investors to take up the opposing side from the majority in order to keep the contract price close to the Index.
- Each protocol in DeFi can only update balances when a user interacts with the protocol.
- For example, in Compound, the interest rate is fixed until supply enters or leaves the pool which changes the utilization.
- The contract simply keeps track of the current rate and the last timestamp when the balances updated.

Derivatives: dYdX

Futures funding rate

- When a new user borrows or supplies, that transaction updates the rates for the entire market.
- Similarly, whereas the dYdX's Funding Rate is updated every second, it is only applied at the time a user opens, closes, or edits a position.
- The contract calculates the new values based on what the rates were and how long the futures position has been open.

Derivatives: dYdX

Layer 2

- On April 20, 2021, dYdX moved the perpetual futures to Layer 2 technology (which we discuss on the fourth course –it is a way to trade off-chain in a secure manner with multi-signature vaults)
- This means trading with no gas fees
- Up to 25x leverage is allowed

Derivatives: dYdX

Margins

- Like a traditional futures contract, the perpetual futures contract has two margins: initial and maintenance.
- Suppose the initial margin is 10%. This means the investor needs to post collateral (or equity) worth 10% of the underlying asset.

Derivatives: dYdX

Traditional long futures

- A long futures contract allows the investor to buy the asset at a set price in the future.
- If the market price rises, the investor can buy the asset at a price cheaper than the market price and the profit is the difference between the market price and the contract price.

Derivatives: dYdX

Traditional short futures

- A short position works similarly except that the investor agrees to sell the asset at a fixed price.
- If the market price falls, the investor can purchase the asset in the open market and sell at the higher price stipulated in the contract.
- The profit is the difference between the contract price and the market price.

Derivatives: dYdX

Futures risk

- The risk is that the price moves against the investor.
- For example, if the investor is long with a 10% margin and the market price drops by 10%, the collateral is gone because the difference between purchasing at the contract price and selling in the open market (at a loss) wipes out the value of the collateral.

Derivatives: dYdX

Futures are not options

- If the underlying asset's price moves the wrong way in an option contract, the option holder can walk away: The exercise of the option is discretionary—that's why it is called an "option"—and no trader would exercise an option to guarantee a loss.
- Futures, however, are obligations.
- As such, traditional exchanges have mechanisms that seek to minimize the chance the contract holder does not default on a losing position.

Derivatives: dYdX

Traditional maintenance margin

- The maintenance margin is the main tool to minimize default.
- Suppose the maintenance margin is 5%.
- On a traditional futures exchange, if the price drops by 5% the investor is required to replenish the collateral to bring it back up to 10%.
- If the investor fails to do this, the exchange liquidates the position.

Derivatives: dYdX

Maintenance margin

- A similar mechanism exists on dYdX, but with important differences.
  1. If any position falls to 5%, keepers will trigger liquidation. If any collateral remains, they may keep it as a reward.
  2. The liquidation is almost instantaneous.
  3. No centralized exchange exists.
  4. dYdX contracts are perpetual, whereas traditional exchange contracts usually have a fixed maturity date.

Part III:

DeFi Deep Dive

3. Derivatives

(ii) dYdX

(d) Perpetual Futures Example

Derivatives: dYdX

Mechanics

- Suppose the BTC price index is 10,000 USDC/BTC.
- An investor initiates a long position by depositing 1,000 USDC as margin (collateral), creating a levered bet on the price of BTC.
- If the price rises by 5%, the profit is 500.
- Given the investor has only deposited 1,000, the investor's rate of return is 50%, or (1,000 – 500)/1,000.

Derivatives: dYdX

Mechanics

- We can also think about the mechanics another way.
- Taking a long position at 10,000, the investor is committing to buying at 10,000 and the obligation is 10,000.
- Think of the obligation as a “negative balance” because the investor must pay 10,000 according to the contract.
- The investor has already committed collateral of 1,000 and owes 9,000. This is sometimes called the “short” or “owed” balance.

Derivatives: dYdX

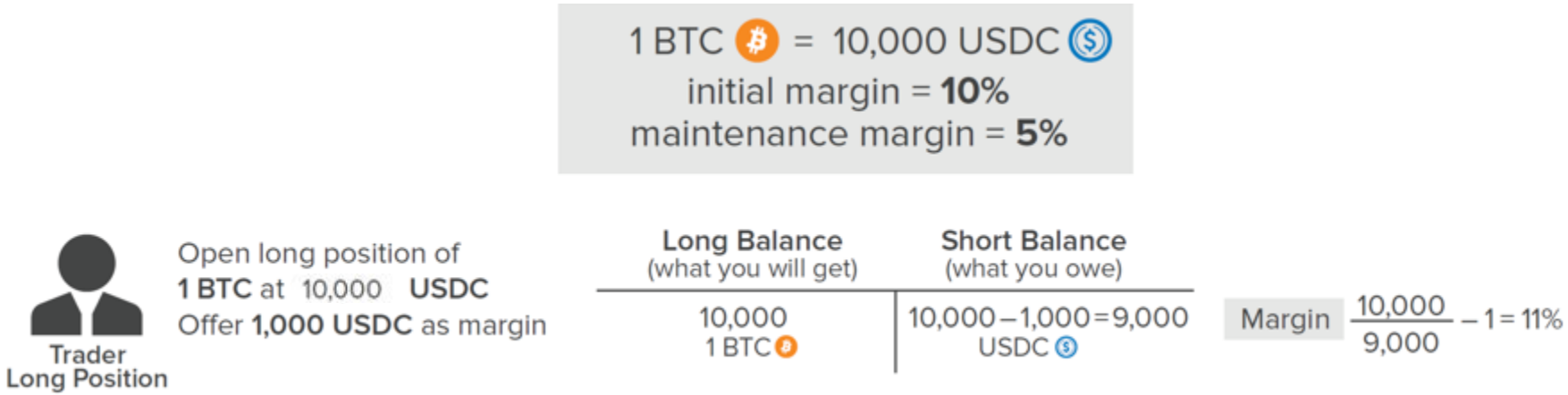
Mechanics

- On the other side of the ledger, the investor has committed those funds to buy an asset, 1 BTC. This is known as the “long” balance.
- The investor thus has a positive balance of 10,000, the current price.
- The collateralization ratio is 10,000/9,000 = 111%, which is a margin percentage of 11% and is nearly the maximum amount of allowed leverage (10% margin).

Derivatives: dYdX

Long position

- Long 1 BTC
- 1 BTC=10,000



Derivatives: dYdX

Long position

- Long 1 BTC
- Price increases by 10%

Scenario A

BTC ↑ by 10% to 11,000

Long Balance	Short Balance
11,000 1 BTC	9,000

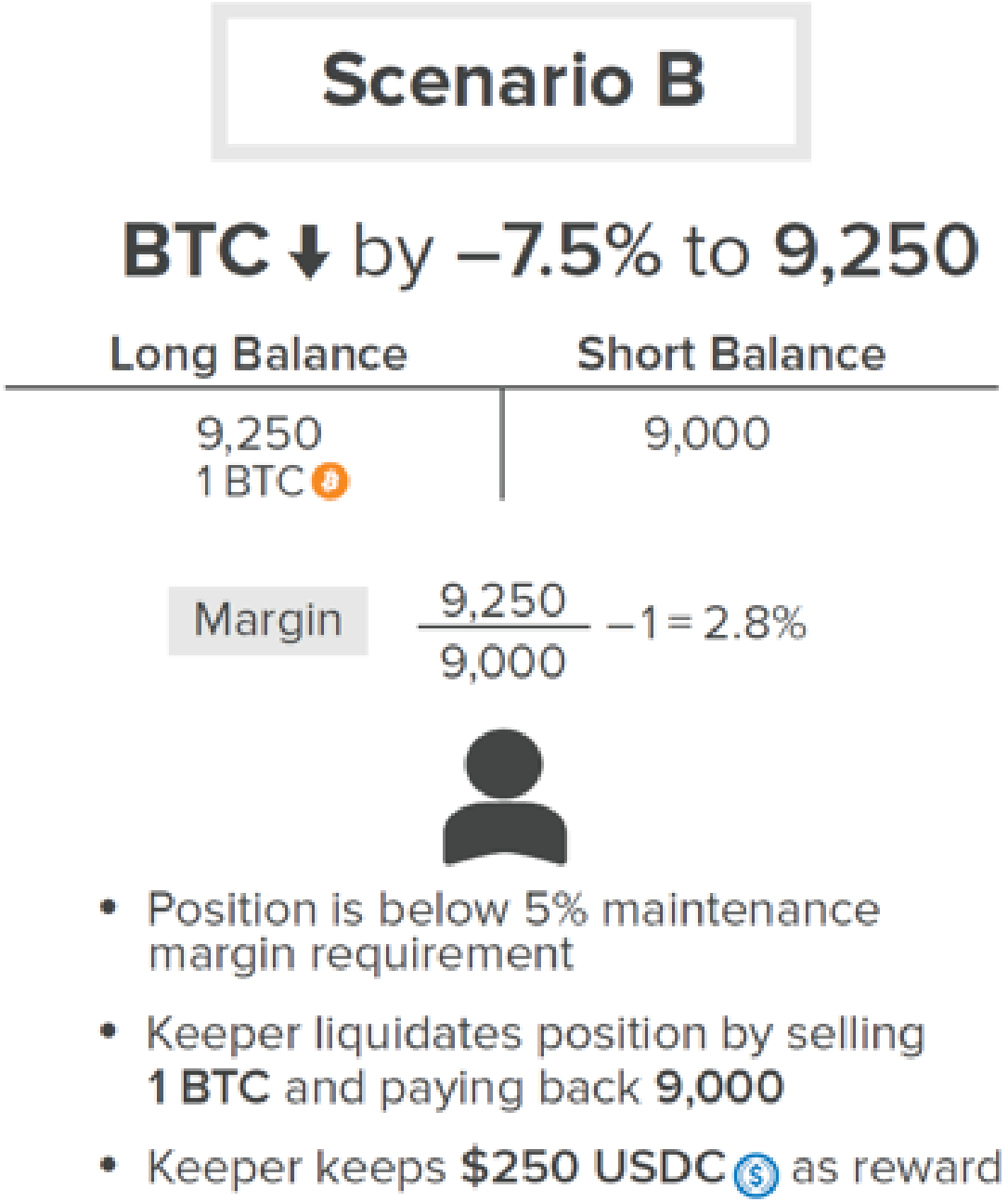
Margin $\frac{11{,}000}{9{,}000} - 1 = 22.2\%$

- Trader can withdraw USDC to bring margin towards **10%**
- Trader can close position with **1000 USDC** profit, which is a ROI of **100%**

Derivatives: dYdX

Long position

- Long 1 BTC
- Price decreases by -7.5%



Derivatives: dYdX

Mechanics

- This intuition works similarly for a short position.
- The investor has committed to sell at 10,000, which is a positive balance and is supplemented by the margin deposit of 1,000 (so total of 11,000).
- The investor's negative balance is the obligation to buy 1 BTC, currently worth 10,000.
- The collateralization ratio is 11,000/10,000, which corresponds to a margin of 10%.

Derivatives: dYdX

Short position when underlying price rises

- Suppose the underlying asset (BTC) increases in value by 5%.
- If the price of BTC increases to 10,500 (a 5% increase), the margin percentage becomes (11,000/10,500) − 1 = 4.76% and the short position becomes subject to liquidation.
- The paper net balance of the position is $500, the incentive for the liquidator to close the position collect the balance.

Derivatives: dYdX

Beyond perpetual futures

- Perpetual options have also been proposed (but they are not available at this time on dYdX)
- The concept of futures-style futures options has been studied before. See Asay (1982) and Whaley (2006, p. 239)
- Since the everlasting option may be written as a portfolio of regular options, we can compute the delta of the position (sensitivity to changes in the underlying asset) and hedge it using the underlying or the perpetual futures

https://onlinelibrary.wiley.com/doi/10.1002/fut.3990020102

Derivatives: dYdX

Summary

- The dYdX BTC perpetual futures contract allows investors to access BTC returns natively on the Ethereum blockchain, while being able to supply any ERC-20 asset as collateral.
- Perpetual futures are rising in popularity, and this functionality may continue to attract liquidity over time.

Derivatives: dYdX

Traditional Finance Problem	**dYdX Solution**
Centralized Control: Borrowing and lending rates controlled by institutions.	dYdX rates are determined algorithmically.
Limited Access: Difficulty in accessing high yield USD investment opportunities or competitive borrowing as well as futures and derivative products. Access to capital for immediately profitable enterprises is limited.	Open ability to borrow or lend any supported assets at competitive algorithmically determined rates. Includes a perpetual futures contract that could synthetically support any asset. Free flash loans give anyone access to large amounts of capital to capitalize on arbitrage or other profitable opportunities.
Inefficiency: Suboptimal rates for borrowing and lending due to inflated costs.	Algorithmically pooled and optimized interest rates. Free flash loans offered for immediate use cases.
Lack of Interoperability: Difficult to repurpose funds within a financial instrument.	Flash loans can immediately utilize the entirety of the AUM for outside opportunities without risk or loss to investors.
Opacity: Unclear collateralization of lending institutions.	Transparent collateralization ratios of borrowers are visible to the entire ecosystem.

Part III:

DeFi Deep Dive

3. Derivatives

(iii) Synthetix

(a) What is Synthetix?

Derivatives: Synthetix

What is Synthetix?

- Many traditional derivative products have a decentralized counterpart.
- DeFi, however, allows new types of derivatives because of smart contracts.
- Imagine creating a derivative cryptoasset, whose value is based on an underlying asset that is neither owned nor escrowed.
- Synthetix is one company whose primary focus is creating a wide variety of liquid synthetic derivatives.

Derivatives: Synthetix

What is Synthetix?

- The company issues *Synths*, tokens whose prices are pegged to an underlying price feed and are backed by collateral.
- MakerDAO's DAI is also a synthetic asset.
- The price feeds come from the Chainlink's decentralized oracles.
- Synths can theoretically track any asset, long or short.
- In practice, the main tracked assets are cryptocurrencies, fiat currencies, and gold.

SYNTHS

Synths are derivative tokens providing exposure to a range of assets. They can be traded with infinite liqiduity and zero slippage by leveraging the Synthetix protocol's unique pooled collateral model. Trades between Synths generate a small fee that is distributed to SNX collateral providers.

ALL CRYPTO FOREX EQUITIES COMMODITY

sBTC
USD PRICE
$41,027.51

Tracks the price of sBTC Bitcoin through price feeds supplied by an oracle.

FEE: 0.30% LIVE

sETH
USD PRICE
$2,595.72

Tracks the price of sETH Ether through price feeds supplied by an oracle.

FEE: 0.25% LIVE

sBNB
USD PRICE
$335.06

Tracks the price of sBNB Binance Coin through price feeds supplied by an oracle.

FEE: 1.00% LIVE

sTRX
USD PRICE
$0.06

Tracks the price of sTRX TRON through price feeds supplied by an oracle.

FEE: 1.00% LIVE

sXTZ
USD PRICE
$3.08

Tracks the price of sXTZ Tezos through price feeds supplied by an oracle.

FEE: 0.85% LIVE

sXRP
USD PRICE
$0.75

Tracks the price of sXRP Ripple through price feeds supplied by an oracle.

FEE: 0.90% LIVE

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ALL CRYPTO FOREX EQUITIES COMMODITY

sUSD

USD PRICE
$1.00

Tracks the price of a single US Dollar (USD). This Synth always remains constant at 1.

FEE: 0.30% LIVE

sEUR

USD PRICE
$1.19

Tracks the price of sEUR Euros through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sJPY

USD PRICE
$0.01

Tracks the price of sJPY Japanese Yen through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sAUD

USD PRICE
$0.73

Tracks the price of sAUD Australian Dollars through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sGBP

USD PRICE
$1.39

Tracks the price of sGBP Pound Sterling through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sCHF

USD PRICE
$1.10

Tracks the price of sCHF Swiss Franc through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

SYNTHS

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ALL CRYPTO FOREX EQUITIES COMMODITY

sFTSE

USD PRICE
$7,032.30

Tracks the price of sFTSE FTSE 100 Index through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sNIKKEI

USD PRICE
$27,283.59

Tracks the price of sNIKKEI Nikkei 225 Index through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sTSLA

USD PRICE
$687.25

Tracks the price of sTSLA Tesla through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sAAPL

USD PRICE
$145.89

Tracks the price of sAAPL Apple through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sFB

USD PRICE
$356.30

Tracks the price of sFB Facebook through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sGOOG

USD PRICE
$2,694.77

Tracks the price of sGOOG Alphabet through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

SYNTHS

Synths are derivative tokens providing exposure to a range of assets. They can be traded with infinite liqiduity and zero slippage by leveraging the Synthetix protocol's unique pooled collateral model. Trades between Synths generate a small fee that is distributed to SNX collateral providers.

ALL CRYPTO FOREX EQUITIES COMMODITY

sXAU

USD PRICE
$1,814.01

Tracks the price of sXAU Gold Ounce through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sXAG

USD PRICE
$25.49

Tracks the price of sXAG Silver Ounce through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

sOIL

USD PRICE
$73.37

Tracks the price of sOIL Perpetual Oil Futures through price feeds supplied by an oracle.

FEE: 0.30% PAUSED

iOIL

USD PRICE
$22.54

Inversely tracks the price of iOIL Inverse Perpetual Oil Futures through price feeds supplied by an oracle.

FEE: 0.30% FROZEN

Derivatives: Synthetix

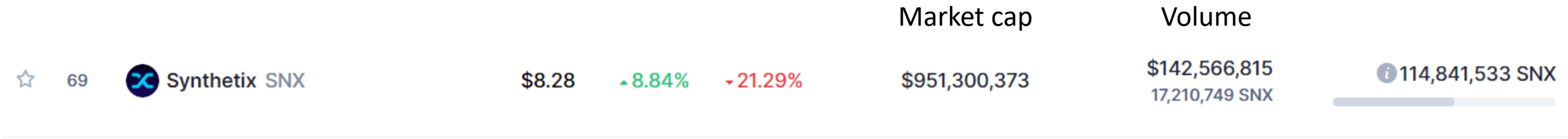
Synthetix tokens

- A long Synth is called an *sToken*, for example, a sUSD or a sBTC.
- The sUSD is a synthetic because its value is based on a price feed.
- A short Synth is called an *iToken*, for example, an iETH.

Derivatives: Synthetix

Synthetix platform token

- Synthetix also has a platform token called SNX. SNX is not a governance token like MKR and COMP, but is a *utility token* or a *network token*, which means it enables the use of Synthetix functionality as its only feature.
- SNX serves as the unique collateral asset for the entire system.



Derivatives: Synthetix

Minting synths

- When users mint Synths against their SNX, they incur a debt proportioned to the total outstanding debt denominated in USD.
- They become *responsible* for this percentage of the debt in the sense that to unlock their SNX collateral they need to return the total USD value of their debt.
- The global debt of all Synths is thus shared collectively by the Synth holders based on the USD-denominated percentage of the debt they owned when they opened their positions.

Derivatives: Synthetix

Minting synths

- The total outstanding USD-denominated debt changes when any Synth's price fluctuates, and each holder remains responsible for the same percentage they were responsible for when they minted their Synths.
- Therefore, when a SNX holder's Synths outperform the collective pool, the holder effectively profits, and vice versa, because their asset value (their Synth position) outpaced the growth of the debt (sum of all sUSD debt).

Derivatives: Synthetix

Minting synths

- In any Synthetix position, the trader is effectively “long” his personal portfolio against the entire pool's portfolio.
- In other words, the trader is betting his returns will exceed the pool’s returns.
- For example, by holding sUSD only, the trader is effectively shorting the entire composition of all other traders’ Synthetix portfolios and betting that USD will outperform all other assets held.
- The trader’s goal is to own Synths that he thinks will outperform the rest of the market, because it is the only way to profit.

Part III:

DeFi Deep Dive

3. Derivatives

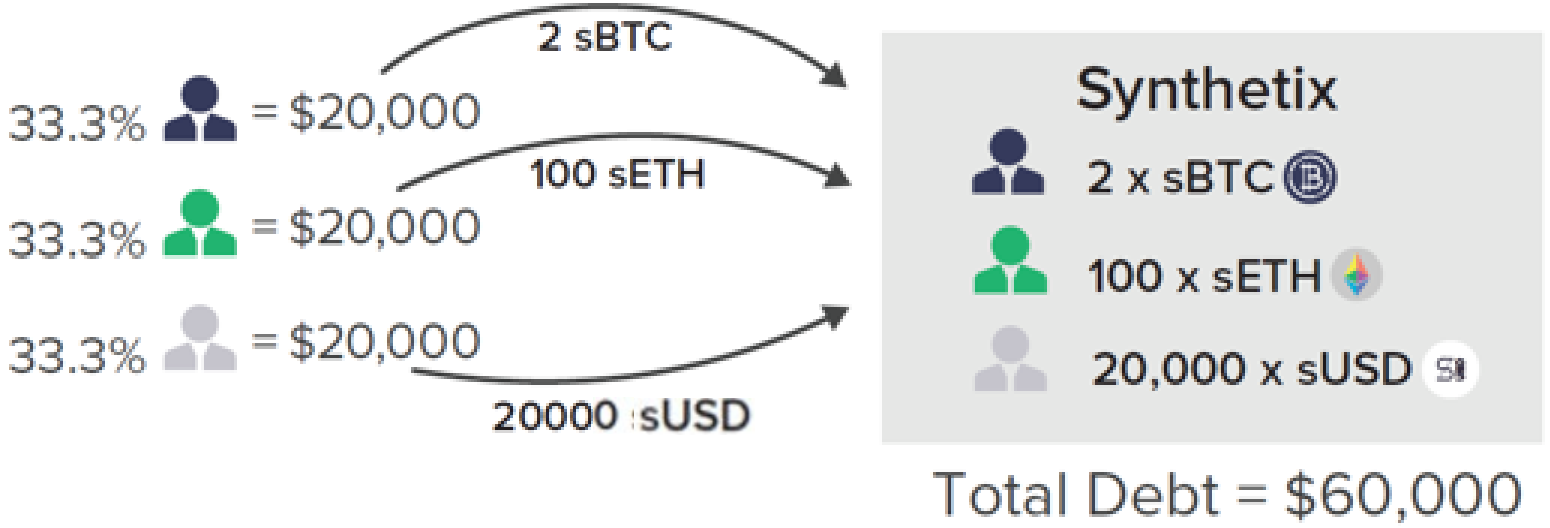
(iii) Synthetix

(b) Mechanics

Derivatives: Synthetix

Example

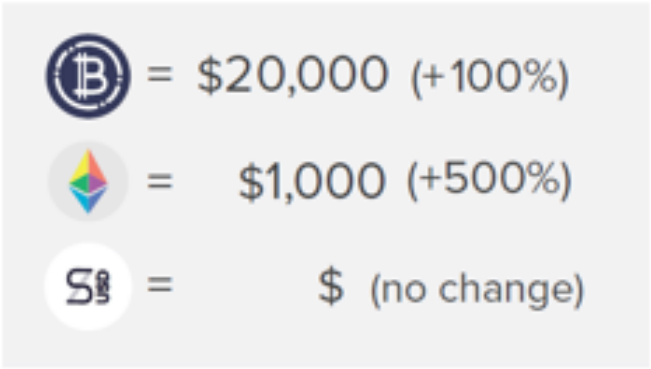
- As an example, three traders each have $20,000 for a total debt of $60,000: one holds 2 sBTC priced at $10,000 each, one holds 100 sETH priced at $200 each, and one holds 20,000 sUSD priced at $1 each. Each has a debt proportion of 33.3%.

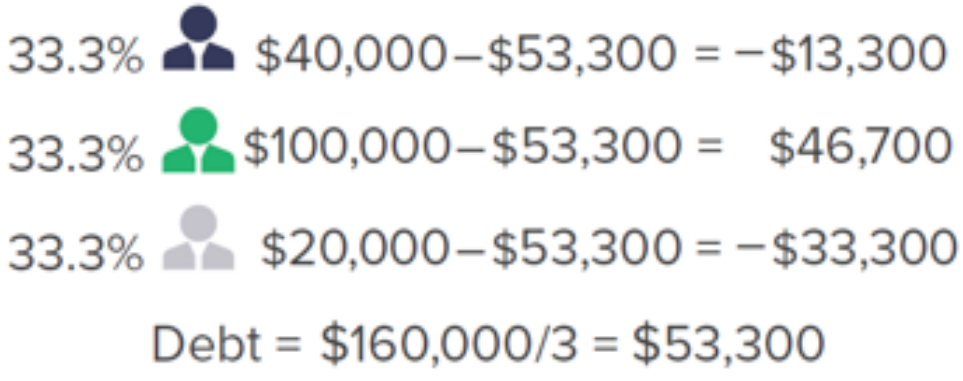


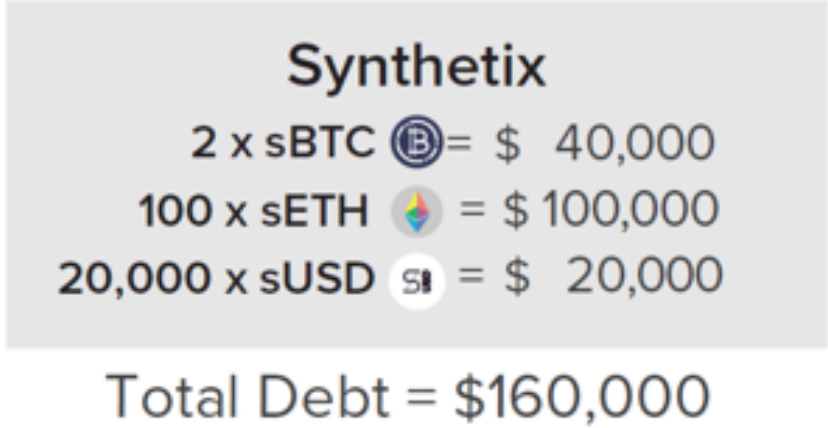
Derivatives: Synthetix

Example

- If the price of BTC doubles to $20,000 and the price of ETH goes up 5x to $1,000, the total debt becomes $160,000 = $40,000 (sBTC) + $100,000 (sETH) + $20,000 (sUSD).
- Because each trader is responsible for 33.3%, about $53,300, only the sETH holder is profitable even though the price of BTC doubled.



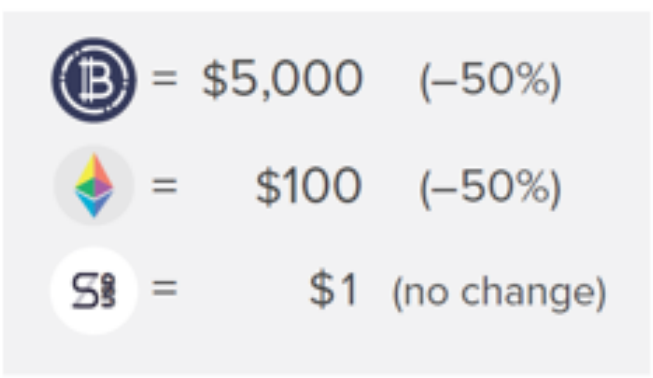


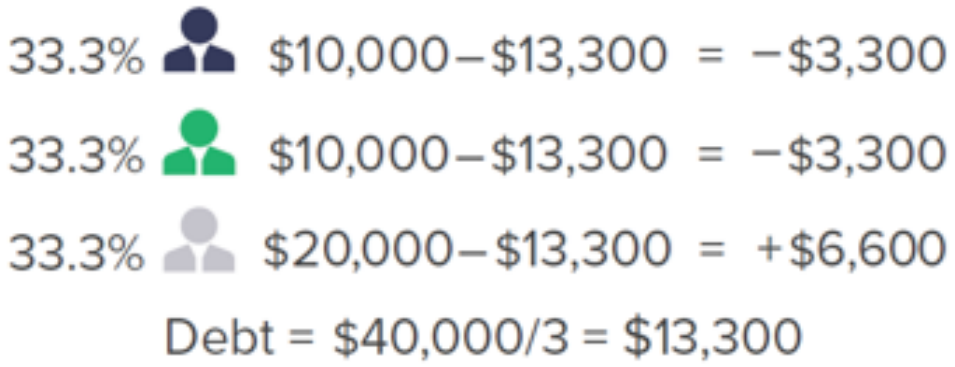


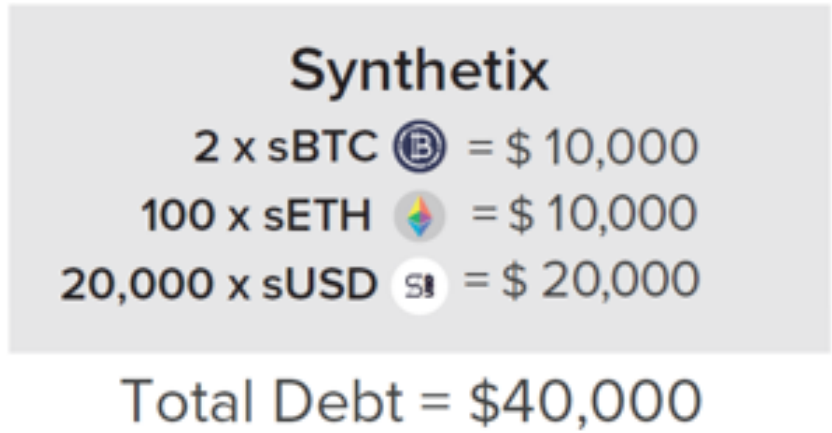
Derivatives: Synthetix

Example

- If the price of BTC falls to $5,000 and ETH to $100, then the total debt falls to $40,000 and the sUSD holder becomes the only profiting trader.







Derivatives: Synthetix

Platform DEX

- The platform has a DEX native that will exchange any two Synths at the rate quoted by the oracle.
- SNX holders pay the exchange fees to a fee pool redeemable by SNX holders in proportion to their percentage of the debt.
- The contracts enforce that users can only redeem their fees if they maintain a sufficient collateralization ratio relative to their portion of the debt.

https://defirate.com/snx-staking-tutorial/

Derivatives: Synthetix

Collateralization

- The required collateralization ratio to mint Synths and participate in staking rewards is high, currently 800%.
- The Synthetix protocol also mints new SNX tokens via inflation to reward various stakeholders in the ecosystem for contributing value.
- The protocol distributes the rewards as a bonus incentive for maintaining a high collateralization ratio or increasing the liquidity of SNX.

https://defirate.com/snx-staking-tutorial/

Derivatives: Synthetix

Collateralization

- Synthetix has branched into products that track real-world equities with the release of sNIKKEI and sFTSE.
- The company is also beginning to offer an options trading interface, further expanding its capabilities.
- The platform could easily gain popularity because there is no slippage against the price feed, however, the pooled liquidity and shared debt models offer interesting challenges.

Derivatives: Synthetix

Traditional Finance Problem	**Synthetix Solution**
Centralized Control: Assets can generally only be bought and sold on registered exchanges.	Offer synthetic assets in one place that can track any real world asset.
Limited Access: Access to certain assets is geographically limited.	Anyone can access Synthetix to buy and sell Synths.
Inefficiency: Large asset purchases suffer from slippage as traders eat into the liquidity pool.	Synths exchange rates are backed by a price feed, which eliminates slippage.
Lack of Interoperability: Real-world assets such as stocks can't be easily represented directly on a blockchain	Synth representations of real assets are totally compatible with Ethereum and other DeFi protocols.
Opacity:	