Aada Finance

Finance accessible to everyone

Aada team

June 2021

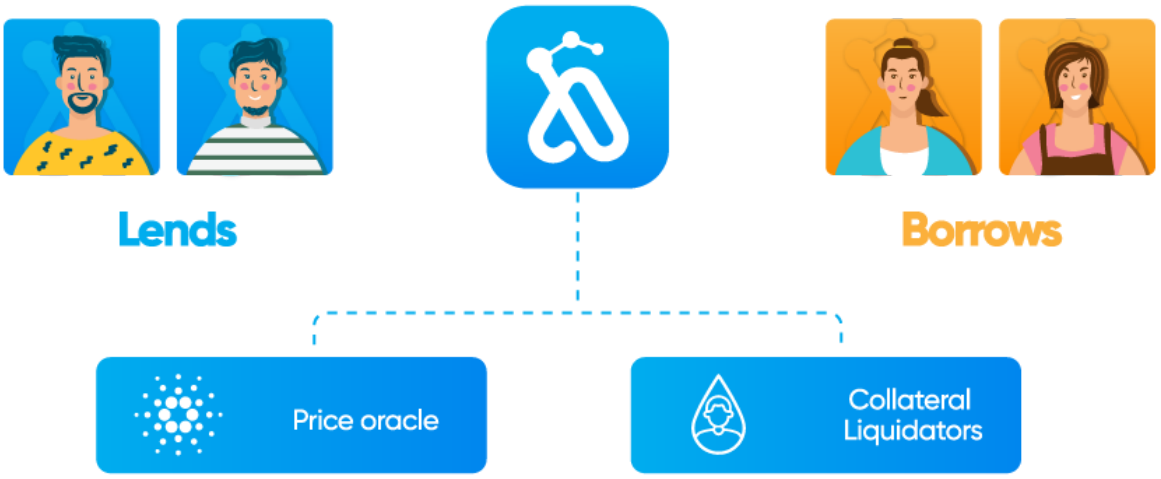
Abstract

While one might think that poverty is the result of rapacious financiers exploiting the poor. We believe it has much more to do with the lack of financial institutions, with the absence of banks, not their presence. Only when borrowers have access to efficient loan networks can they escape from the clutches of loan sharks, and only when savers can deposit their money in reliable banks can it be channelled from the idle to the industrious or from the rich to the poor.

1.Introduction

Lending as a service is not new. Lending originated during the XV century in Florence, Italy. The family of Medici also know as the first bankers opened their stool next to Cavalcanti palace in Florence. Shortly after starting one of Medici became the unofficial head of state of the Florentine republic. Riches accumulated by the Medici family can only be outweighed by riches held by current banking companies.

For centuries, managing financial assets created the rich from whom even the king of England had to get permission to go to war. We at Aada believe that we can reverse engineer the most profitable sector - banking. We seek to take the core function of first bankers and build it into the code. Take lending and build into decentralized protocol owned by none, and everyone.



At a core, Aada is an intermediate protocol standing between Lender and Borrower. Lenders are also known as depositors are pooling their assets into the smart-contract controlled pool. These assets can be borrowed at any time by a borrower. Borrowers have to pay an interest rate that is automatically calculated by asset utilization.

A low utilization rate means a lot of assets are not used, this results in lower interest rates for depositors as well as for borrowers.

However, when assets are in demand and the utilization rate is high - interest rates will grow. This will result in fewer assets borrowed (due to high price) as well as it will attract more depositors seeking high returns on their deposits. That's Aada platform in short.

The rest of the paper is organized as follows. We first discuss the protocol and how stability is achieved and maintained, utilization rate, and variable returns rate. We then dig deeper into what actions can be done on the Aada platform. Lastly, how AADA token is used to achieve stability and safety of the platform.

2.Stability and utilization rate

2.1. Utilization rate

Utilization rate is calculated as follows:

$$U = TotalBorrows / TotalLiquidity$$

U monitors which share of the reserve's total capital is borrowed at time t. As U gets closer to 100%, the capital becomes scarcer until no more liquidity is available when $U = 100\%$This situation can be problematic if depositors wish to withdraw their liquidity, but no funds are available. Still high utilisation results in high returns for depositors. Its therefore essential to maximise utilisation while protecting liquidity. The interest rate model is calibrated around an optimal utilisation rate $Uoptimal$per reserve that reflects market conditions. $Uoptimal$can be determined by looking into historical utilization rate. Historical data will help to determine market conditions and calculate the most optimal rate for borrowers.

2.2.Borrow interest rate

Aada's interest rate aim is to manage liquidity risk and optimise utilisation rate. The borrow interest rates come from the Utilisation Rate U.

U *is an indicator of the availability of capital in the pool. The interest rate is used to manage liquidity risk through user incentivises to support liquidity:*

- *<u>When capital is available</u>: low interest rates to encourage more loans from borrowers.*
- *<u>When capital is scarce</u>: high interest rates to encourage repayments of loans and more deposits from lenders*

2.2.1. Interest rate model

Liquidity risk appears when utilisation is high, it becomes more problematic as Unears to 100%. To tailor the model to this constraint, the interest rate curve is split in two parts around an optimal utilisation rate $Uoptimal$ Uopimal. Before $Uoptimal$ the slope is small, after it starts rising sharply.

The interest rate Rt follows the model:

$$if\ U < U_{optimal}: \qquad R_t = R_0 + \frac{U_t}{U_{optimal}} R_{slope1}$$

$$if\ U \geq U_{optimal}: \qquad R_t = R_0 + R_{slope1} + \frac{U_t - U_{optimal}}{1 - U_{optimal}} R_{slope2}$$

2.3. Deposit APY

The borrow interest rates paid are distributed as yield for aaToken holders who have deposited in the protocol, excluding a share of yields sent to the ecosystem reserve defined by the reserve factor. This interest rate is paid on the capital that is lent out then shared among all the liquidity providers. The deposit APY, Dt is:

$$D_t = U_t(SB_tS_t + VB_tV_t)(1 - R_t)$$

- U_t , the utilisation ratio
- SB_t , the share of stable borrows
- S_t , the average stable rate
- VB_t , the share of variable borrows
- V_t , the variable rate
- R_t , the reserve factor

3.Governance

3.1.Right to vote

In order to vote you need to hold AADA on your wallet or be staked AADA tokens on the Aada platform. Additionally, we do want to provide higher vote weight to users who are providing liquidity on DEX pools. This would put Adaa future into the hands of people who cares about protocol success the most. However, we can't assure this functionality before stable DEX platform is built on Cardano.

3.2.Voting threshold

The threshold is dynamic and can change depending on the quorum plus the difference in votes for and against a proposal.

If there are only a few votes against a proposal, the threshold will not change. However, if the number of votes against the proposal is significant, the threshold can be raised so that there

must be more votes in favor for the proposal to pass. This is done to ensure that a proposal receives widespread approval before it is implemented. For example:

- If the quorum is 30%, the differential is 25% and 3% of the total votes are against the Proposal, the threshold would remain at 30% (because 25+3 = 28 < 30).
- If the quorum is 30%, the differential is 25% and 6% of the total votes are against the Proposal, then the threshold would be raised to 31% (because 25+6=31), so more "yes" votes would be required for the Proposal to pass.

3.3. Aada Improvement proposal (AIP)

AIP is an acronym for Aada Improvement Proposal, just as BIP is an acronym for Bitcoin Investment Proposal. The AIPs set out the technical standards (protocol specifications, contract standards, client APIs etc.) for the Aada protocol.

4. AADA token

4.1. Staking

4.1.1. Staking incentives

Stakers within the Safety Module receive Safety Incentives. The initial SI rewards are [750 AADA/day + collected platform fees] to be split between the stakers. The Safety Incentive's allocation quarterly date should be voted on before the end of the 3 months (90 days) distribution schedule. In the case of a late or no vote on a new SI allocation plan, the current allocation will continue until a vote or until the Aada Reserve is empty.

4.2. Risk of staking

In the case of a shortfall event, the Safety Module uses up to 30% of the assets locked to cover the deficit.

Shortfall event

The main role of the Safety Module is to protect the protocol against unexpected loss of funds stemming from:

- **Smart contract risk**: On the smart contract layer, there is a risk of a bug, a design flaw, or a potential attack.
- **Liquidation risk**: The risk of an asset failing that is being used as collateral on AADA; the risk of liquidators failing to capture liquidation opportunities in a timely manner; or the risk of the principal asset to be repaid having low market liquidity.
- **Oracle failure risk**: Risk of the Oracle system failing to properly update prices in the event of a severe market downturn and network congestion; risk of the Oracle system failing to properly submit prices, resulting in improper liquidations.

In the event of a shortfall event, the Safety Module will use up to 35% of the capital that has been placed as a pledge. Recovery issuance occurs if the seized SM assets don't cover the total debt. The drawn SM amount and the issued AADA go toward covering the deficit.
35% rate can be reduced or increased as well as any other variables via AIP.

5. Other platform ingredients

5.1. Price oracles

Price oracles will help to calculate health factor which might trigger liquidation. Prices will be queried from chainlink, charl3 however fallback price oracle might be needed. Thus will be build and maintained by Aada team.

5.2. Flash loans

Due to the technical knowledge required to execute one, flash loans are a feature designed for developers. Flash Loans allow you to borrow any amount of available assets without putting up any collateral, as long as the liquidity is returned to the protocol within one block transaction. To do a Flash Loan, you must first create a contract requesting a Flash Loan. The contract must then follow the instructions and repay the loan plus interest and fees in the same transaction.

One of the most popular flash loan function - arbitraging. One can accumulate unlimited amount of assets and do instant buy and sell actions to make positive returns.

5.3. Tokenization

For liquidity providers, the Aada protocol provides a tokenization strategy. Upon deposit, the depositor receives a matching quantity of Aada Tokens (aaTokens for short), which are derivative tokens that map 1:1 to the underlying assets. Every depositor's aaToken balance grows over time due to the permanent accrual of interest on deposits. Cardano is fully supported by aaTokens. The concept of interest rate redirection is also naturally implemented in aaTokens. The value gained over time by the borrowers' interest rate payments is, in fact, distinct from the principal value. Once a balance of aaTokens has been reached, the accrued value can be forwarded to any address, thereby separating the amount and the interest earned. The interest stream is the continual flow of accrued interest over time.

To implement this tokenization strategy, Aada introduced the following concepts in the aaToken contract:

1. User x balance index: Is the value of the reserve normalized income at the moment of execution of the last action by the user.

2.The principal balance of the Cardano aaToken contract is the balance that is stored in the balances mapping of the contract. Every action that the user takes on the aaToken contract results in an update to the principal balance of the contract (deposit, redeem, transfer, liquidation, interest rate redirection)

3. Redirection address: When a user decides to redirect his interest stream to another address, a new redirection address is provided. If no redirection of the interest stream is performed

4. Redirected Balance: Whenever a user redirects his interest stream, the balance of user redirecting is added to the redirected balance of the address specified. Defined as follows:

$$B_r^x = \sum_X B_p$$

Where X is the set of users redirecting the interest stream to the user x The redirected balance decreases whenever a user $x0 \in X$ redeems or transfers his aaTokens to another user that is not redirecting to x.

5. Current balance: Is the balance returned by the balanceOf() function of the aaToken contract. Defined as follows:

$$\mathrm{B}_c^x = \begin{cases} 0, \text{ if } B_p^x = 0 \text{ and } B_r^x = 0 \\ B_p^x + B_r^x(\frac{I_n}{I_x} - 1), \text{ if } A_r <> 0 \\ B_p^x \frac{I_n}{I_x} + B_r^x(\frac{I_n}{I_x} - 1), \text{ if } A_r = 0 \end{cases}$$

5.4.Limitations of the tokenization model

When compared to the widely used, exchange rate-based approach, the tokenization model described here has numerous advantages, but it also has some disadvantages, including the following:

1. It is not possible to transfer the entire balance in one transaction: There is no way to specify the exact amount to transfer due to the perpetual accrual of interest, as the interest will continue to accrue even while the transfer transaction is being confirmed, due to the perpetual accrual of the interest rate. This means that it is impossible to have a balance of exactly zero after a transfer; instead, a very small balance (dust balance) will be left on the from account that executed the transfer. It should be noted that this could have been avoided by including specific logic to deal with this particular edge case; however, doing so would have resulted in the addition of non-standard behavior to the Cardano transfer function, which we chose to avoid. Despite the fact that this is not a relevant issue, it is important to note that it is possible to completely clear the remaining balance by either
1. executing another transfer, which will most likely transfer the remaining dust balance because it would be too small to accrue interest in a reasonable amount of time, or
2. redeeming the dust balance and transferring the underlying asset (which is the preferred method).

2. It is only possible to redirect interest streams if there is a principal balance: This means that only accounts with a principal balance are eligible to redirect their interest streams. Users' interest redirection is reset if they completely redeem or transfer their account balance. As a result, interest generated solely by the redirected balance cannot be redirected as a result of this.

5.5. Liquidations

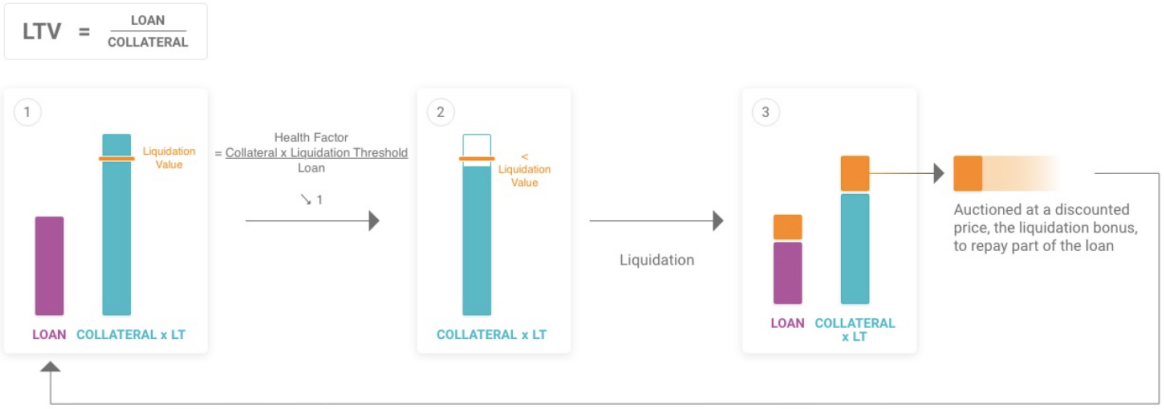
Liquidation is a process that occurs when a borrower's health factor goes below 1 due to their collateral value not properly covering their loan/debt value. This might happen when the collateral decreases in value or the borrowed debt increases in value against each other. This collateral vs loan value ratio is shown in the health factor. In a liquidation, up to 50% of a borrower's debt is repaid and that value + liquidation fee is taken from the collateral available, so after a liquidation amount liquidated from the debt is repaid.

5.6. Health Factor

For each wallet, these risks parameters enable the calculation of the health factor:

$$H_f = \frac{\sum Collateral_i \; in \;\; ADA \times Liquidation \, Threshold_i}{Total \; Borrows \; in \;\; ADA}$$

When health factor is less than 1 (more assets borrowed than deposited) the loan may be liquidated to maintain solvency as described in the diagram below.



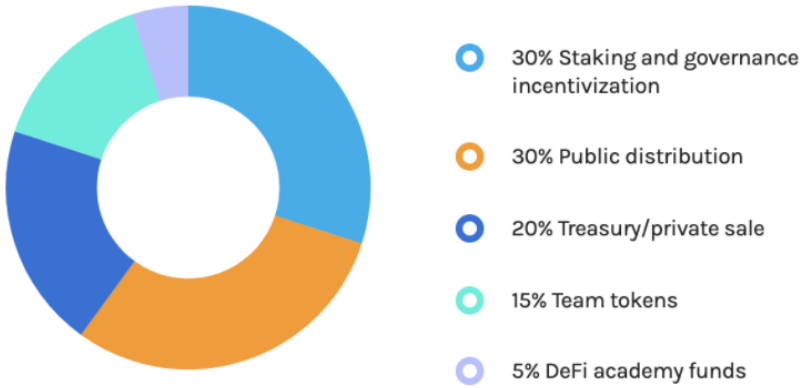
Risk Parameters Safeguard Solvency

6.Is there any risk?

There is no platform that is completely risk-free. The smart contract risk (the possibility of a flaw in the Haskell code) and the liquidation risk are two dangers associated with the Aada platform. Every precaution has been made to reduce the risk to the greatest extent practicable. Experts will audit the Aada code once it is launched. In addition, there will be a bug bounty program that will be active at all times.

7.Tokenomics:

Total supply: 100 000 000 AADA



More details - gitbook