tokenomics audit

Audit overview

Introduction

The goal of this document is to provide a tokenomics audit for Algem. Algem is a liquid staking DeFi app for Astar Network and Polkadot.

The goals of this audit are to:

1) Test whether Algem's economy is robust and sustainable.
2) Understand whether Algem can experience price appreciation.
3) Investigate whether Algem is exposed to overleveraged positions which could break the overall system.

Algem has three main functions:

1) Liquid staking.
2) Liquid lending.
3) ALGM stake to earn.

Down below we will break down all of the functions.

Assumptions

1) Algem interacts with various external actors, and hence is exposed to external forces. More specifically, it deals with ASTR (Astar Network's native token), and various dApps on this network. The stability or reputation of these apps as well as other external forces is taken as a separate concern.
2) The audit is not concerned with Algem's business or marketing model. If, for example, the dApps chosen are not popular, or PolkaDot faces issues (for whatever reason), this is a completely separate concern. These are choices made at the governance level.

Tools of the analysis

1) Structural: System break down.
2) Numerical techniques and simulations.
3) Marginal case studies analysis: Examine scenarios of complete instability (e.g. excessive demand or excessive sell pressure), and whether Algem would hold.

Summary and Conclusions of the Audit

The audit examined Algem's using structural analysis, data from other projects, as well as simulations.

The conclusions are the following:

Conclusion 1
Algem's tokenomics are robust, and there are no Ponzi-like elements or self-feeding loops which could cause a pump-and-dump. To that extent, Algem's only weak point are dependency on Astar's ecosystem and the wider crypto market. Similar dependencies and externalities exist for any kind of project and therefore are not a tokenomics concern.

Conclusion 2
Much like many other early-stage crypto-projects, Algem has to use a significant part of its supply in its early stages for investors, airdrops, and community rewards. This can often lead to an oversupply of tokens, which can put downward pressure on the price. The audit led to the creation of two new mechanisms (explained in Appendix 2). Both mechanisms are also controlled through governance, so they are adaptive, but they also give extra incentives and motives for users to participate in governance.

Final conclusion
Algem was found to have robust tokenomics. There are no problems with the internal design of the system, or the token allocation and distribution strategy. Algem is also fairly adaptive, with governance playing a key role in some of the mechanisms that control demand and supply.

Any issues that arise in the project are more likely to come from outside forces (such as market conditions). Therefore, the project's tokenomics clearly pass all checks and it is awarded an AAA rating.

Rating

Structure: **5/5**
Allocation: **5/5**
Distribution: **5/5**
Stress tests: **5/5**

About the auditor

Dr. Stylianos Kampakis

Dr. Stylianos (Stelios) Kampakis is a data scientist and blockchain expert with more than 10 years of experience in technology. He has worked with decision-makers from companies of all sizes: from startups to organizations like the US Navy, Vodafone, and British Land. His work expands multiple sectors including fintech (fraud detection and valuation models), sports analytics, healtech, general AI, medical statistics, predictive maintenance, and others. He has worked with many different types of technologies, from statistical models to deep learning to blockchain and he has 2 patents pending.

He was one of the first researchers in the area of tokenomics, as well as one of the first to create valuation models for NFTs.

He is a member of the Royal Statistical Society, honorary research fellow at the UCL Centre for Blockchain Technologies, editor at the Journal of the British Blockchain Association, a data science advisor for London Business School and CEO of The Tesseract Academy.

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Audit breakdown

Algem Token Flow
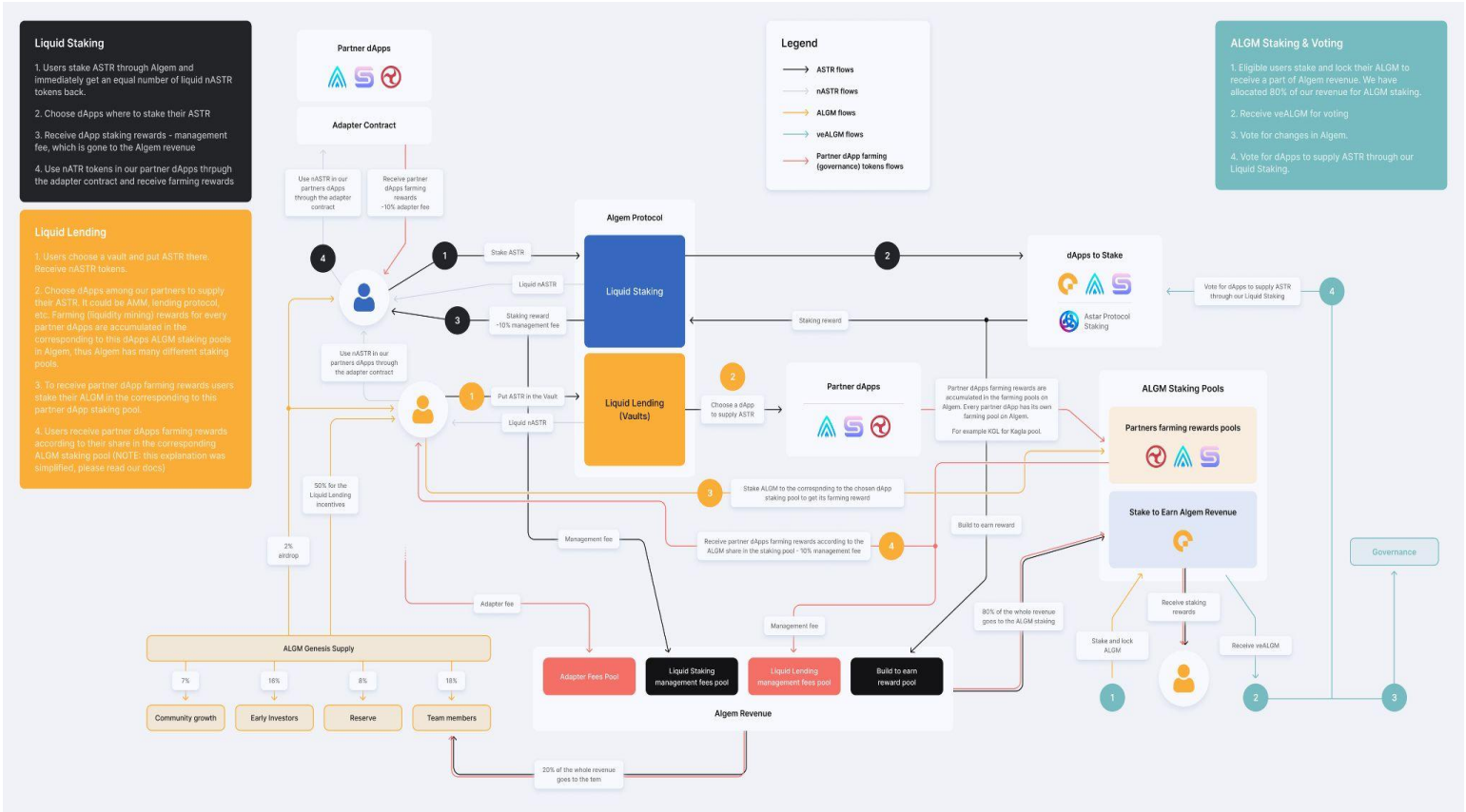
Algem Token Flow: 📄 *AlgemValueFlow.jpg*

Liquid Staking

How It Works

Introduction
The first and most important component of the Algem protocol that leverages the Astar network's dApp staking is liquid staking. Algem's liquid staking solution, which employs tradable liquid nASTR tokens, allows users to continue collecting dApp staking rewards while boosting their revenue.
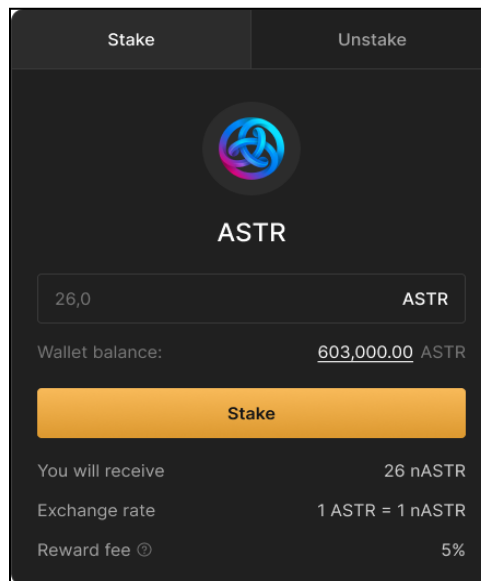
The purpose of liquid staking is to overcome difficulties such as liquidity and fund utilization efficiency. Users are regularly faced with a decision between protocol staking and liquidity mining in dApps, and the Algem approach allows users to achieve the preferences of both methods at the same time.

Summary
1) When staking their ASTR with Algem's liquid staking mechanism, users receive liquid nASTR tokens on a 1:1 basis.
2) Users' new nASTR tokens can be used for farming, lending, etc.
3) nASTR is pegged to ASTR, therefore dApps can implement the same use cases for this nASTR as they would for ASTR and in turn increase their liquidity.
4) For users, staking rewards are distributed according to the current dApp staking APR and rules.

Step by Step Process
1) ASTR is staked by the user using the staking form:

Algem Staking Form

2) Deposited ASTR tokens are delegated immediately to the Astar network's Staking dApps by Algem's smart contracts and begin collecting staking rewards.
3) nASTR tokens are minted automatically on a 1:1 basis. No need to claim manually.
4) Staking amount and rewards are shown on the staking dashboard:
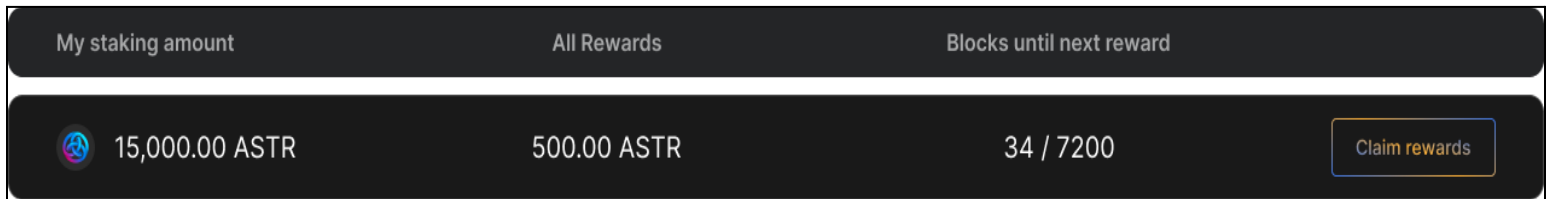
Algem Staking Dashboard

5) The rewards are distributed every ERA according to the current staking APR and amount of nASTR tokens in the user address (nASTR in pools on other dApps are also counted). Claimable manually. Algem charges a management fee from the staking reward.
6) It's possible to unstake ASTR anytime via the unstaking form:
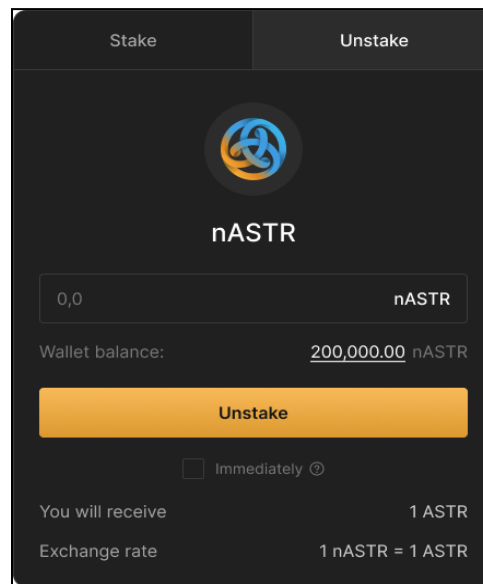
Algem Unstaking Form

7) When unstaking, users can opt to receive ASTR tokens immediately via Algem unstaking pool. In this case, Algem charges a commission. Or users can wait for 10 ERAs and unstake without commission.
8) Algem sends 10% of the revenue (commissions + build-to-earn[1] rewards) to the unstaking pool.

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[1] https://docs.astar.network/docs/dapp-staking/

Liquid lending

How It Works

Introduction

Algem's second and most essential feature is liquid lending, which introduces a new concept and service to the entire DeFi market. Users may continue to earn lending or farming rewards while increasing their revenue with ALGM rewards and tradable liquid nASTR tokens using Algem's liquid lending solution.

Liquid lending utilizes the same processes as liquid staking, but instead of engaging just with Astar's dApp staking, it is directly linked to other dApp protocols throughout the Astar network. Users may use Algem to give and lend their tokens to dApp protocols in exchange for liquid nASTR tokens indicating their lending position. Through Algem, ASTR holders can provide or lend their tokens to lending or staking platforms, stablecoin projects, decentralized exchanges, or other DeFi protocols.

Summary

1) User provides ASTR to a lending vault. The vault then hands out triple rewards:

   a) Rewards in the governance token of the dApp.
   b) ALGM rewards.
   c) nASTR.

2) The same as in the liquid staking case, users' new nASTR tokens can be used for farming, lending, etc and nASTR is pegged to ASTR, therefore dApps can implement the same use cases for this nASTR as they would for ASTR and in turn increase their liquidity.
3) To obtain the incentives in governance tokens, the user must stake all of the ALGM acquired as rewards back into the vault.
4) The rewards in governance tokens and ALGM are calculated by formulas (equations will be explained below) and distributed back to users.

Step by Step Process

1) Users choose between three vaults:
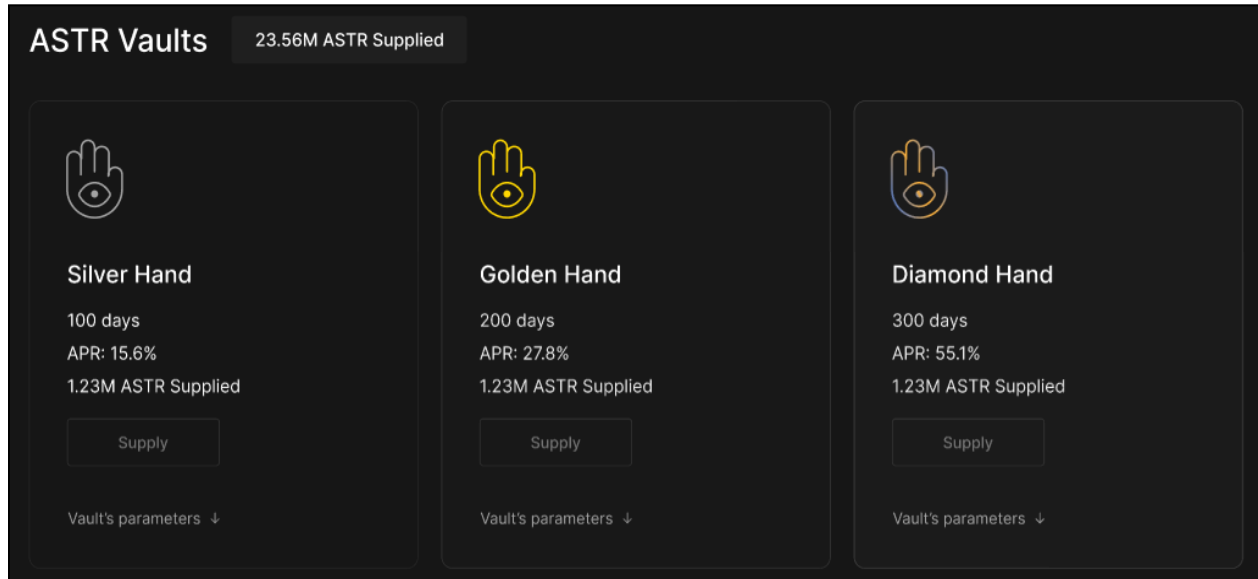
Algem ASTR Vaults

   a) Vaults differ in terms of time (100, 200, or 300 days) and the quantity of ALGM rewards; vaults with a longer period get higher ALGM incentives. This is not a lock; it is simply a depiction of how many days customers will earn ALGM rewards. Tokens can be unstaked at any moment.

2) Then users choose a partner dApp to supply ASTR.

   a) Step 1: the user chooses a dApp.
   b) Step 2: The user specifies the number of tokens to supply.
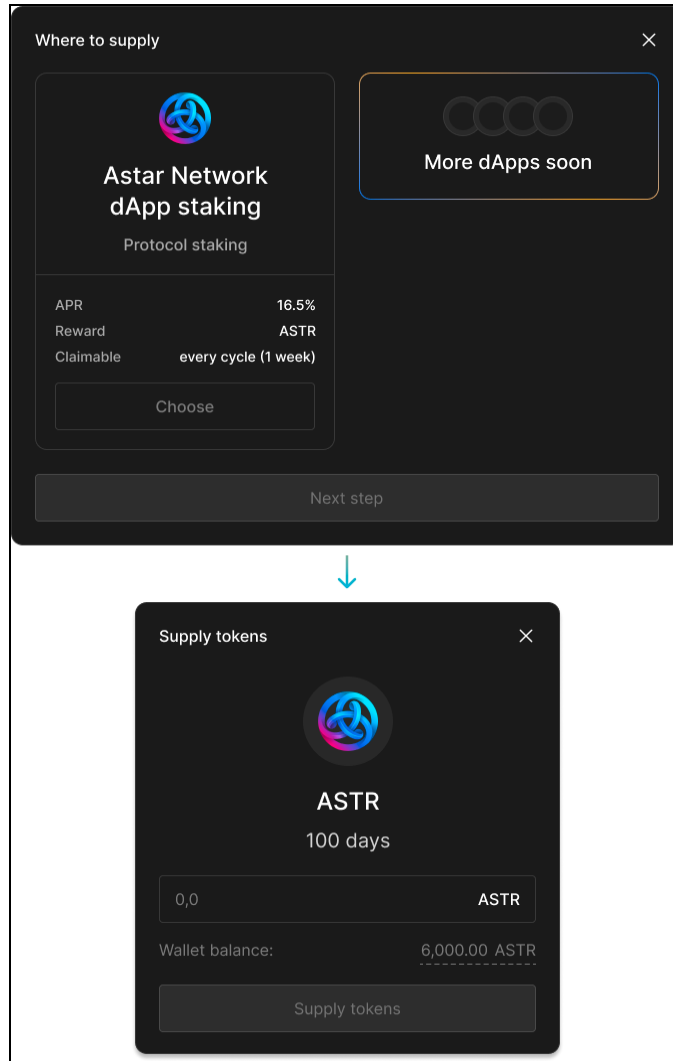
Partner dApp Selection

3) Partner dApp generates lending rewards using this ASTR; Rewards type and current APR for every partner dApp are shown in the first step:
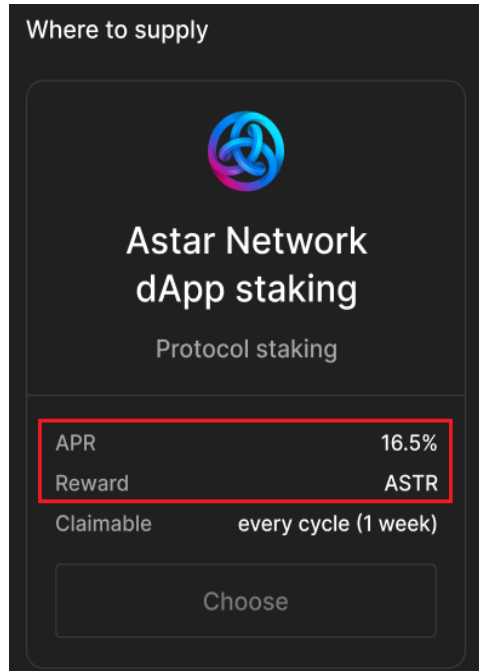
Partner dApp APR

4) Then users can manage their deposit on the dashboard:
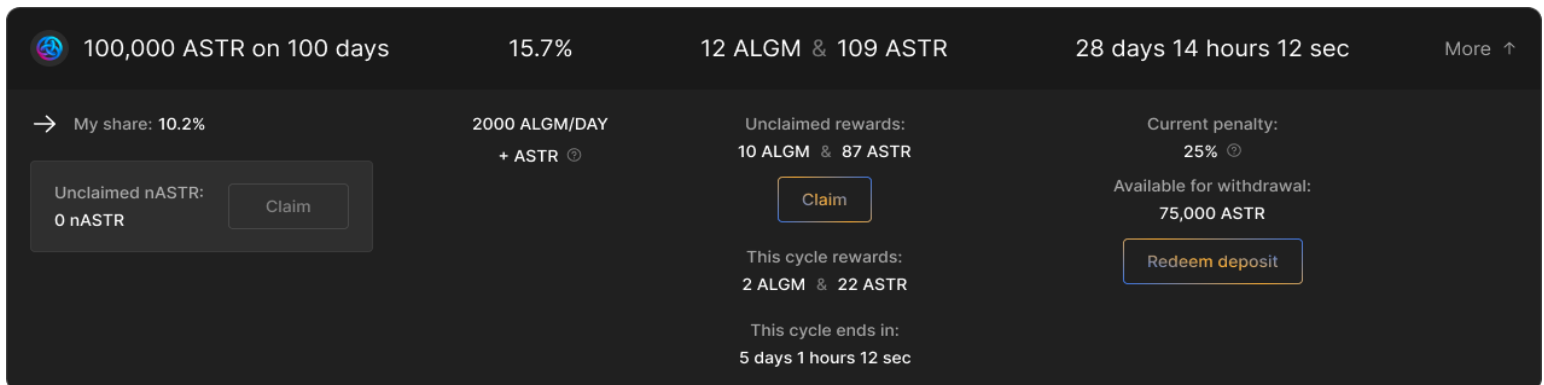
Management Dashboard

5) Incentives distribution:

   a) Users get ALGM incentives according to their % share of ASTR in the vault.
   b) Incentives are distributed once a week. (1 week = 1 cycle).
   c) Need to claim and re-stake in the corresponding staking pool.

6) Partner dApp lending rewards distribution:

   a) Rewards are distributed among ASTR suppliers in proportion to the ASTR in their vault and the ALGM in their corresponding staking pool.
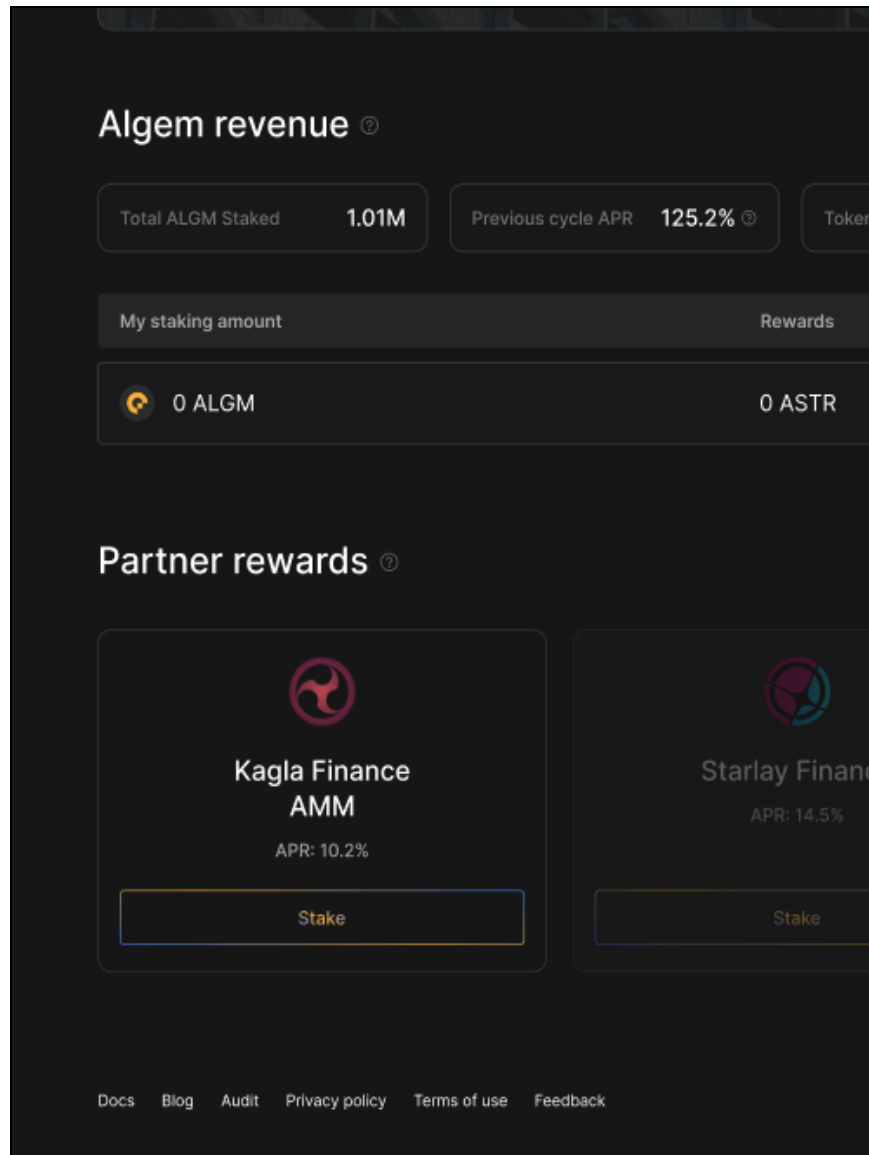
Part of the ALGM staking page

b) Rectangle shape under the "Algem revenue" refers to the distribution of Algem's dApp revenue (build-to-earn, fees, etc.). Users could stake ALGM to get a part of Algem's revenue in ASTR tokens.

c) Under the "Partner rewards" title are shown corresponding to partners' dApps/protocols ALGM staking pools. The pools accumulate partner staking/lending/farming rewards and then distribute them to the suppliers.

Rewards are defined by the following equations[2]:

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[2] *Rewards are distributed among ASTR suppliers in proportion to the ASTR in their vault and the ALGM in their corresponding staking pool (above in the picture we can see an example of the Kagla staking pool).*

$$rewards_{algm} = \frac{user_{algm}}{vault_{algm}}$$

$$rewards_{govtoken} = a * \frac{user_{algm}}{vault_{algm}} + (1 - a) * \frac{user_{astr}}{vault_{astr}}$$

a: A weighting parameter that determines the balance between ALGM and ASTR required for the governance token of a vault. The parameter takes values in [0,1].

$user_{algm}$: the total amount of ALGM staked in this vault by this particular user

$vault_{algm}$: the sum of all ALGM staked in the vault across all users

$user_{astr}$: the total amount of ASTR staked in this vault by a particular user

$vault_{astr}$: the sum of all ASTR stated in a vault across all users

The parameter *a* is determined by a linear function, that is a function of the week. The function starts at 0 and reaches 100% over the lifetime of the vault.

$$a = \frac{n}{lifetime}$$

Where *n* is the current week of participation for a given user, and lifetime is the total lifetime of a vault. Lifetime is measured with respect to when a user joined. Hence, if the total lifetime of a vault is 10 weeks, one user could be in week 9, but another user could be in week 1.
This defines a simple linear function as shown below:
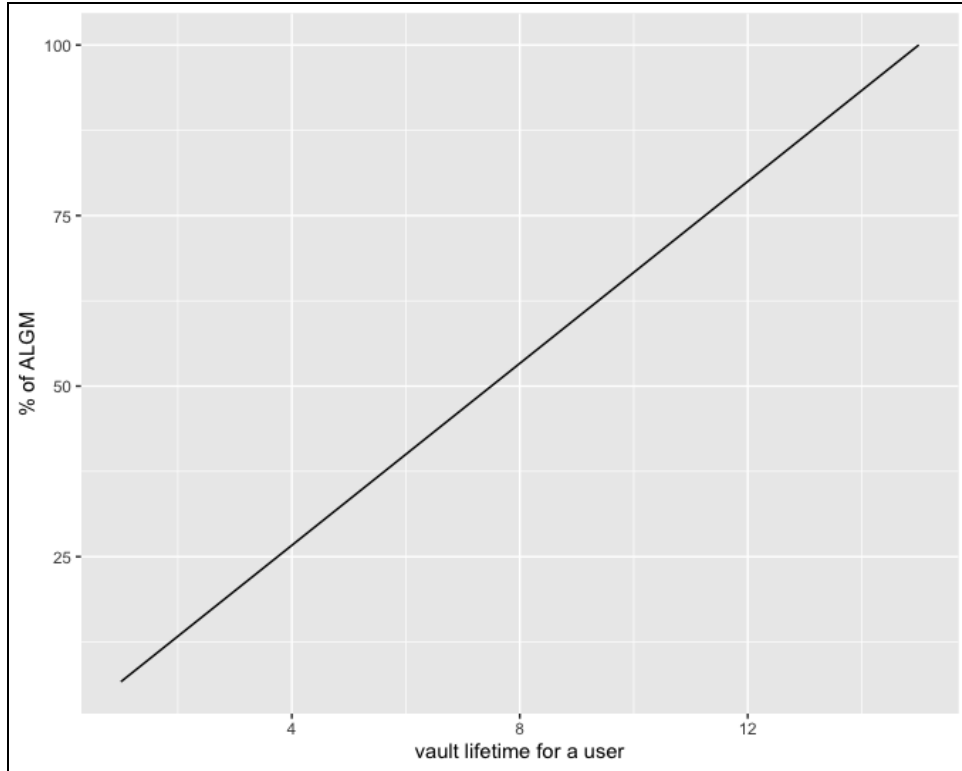
Percentage of ALGM required to stake (versus ASTR) in order to receive governance token rewards

7) nASTR

In addition to the above, the user also gets back nASTR. However, in contrast to liquid lending, the user receives the nASTR over time. The nASTR are unlocked daily over the lifecycle of a vault.

8) Users can resupply their ASTR tokens to other partner dApp/protocols. To do this, he has to unstake ALGM from the current staking pool (dApp) and stake to the new pool:
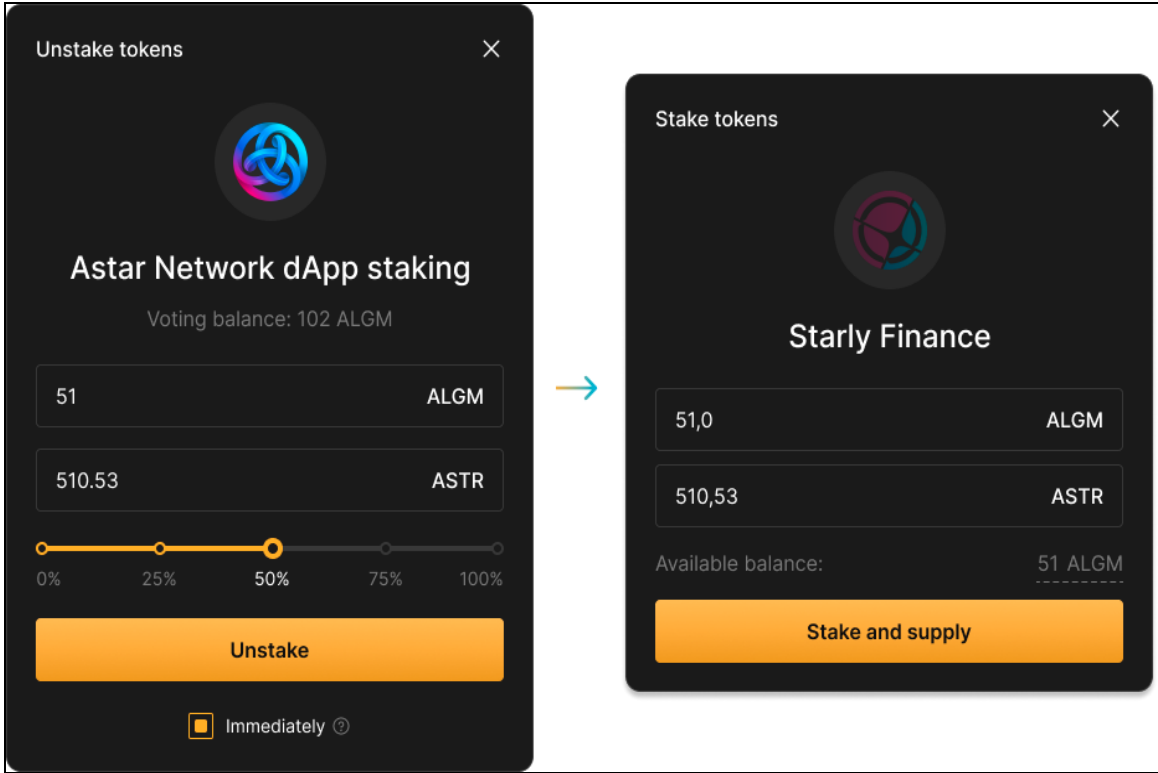
Unstaking Page

Stake to Earn

How It Works

ALGM stake-to-earn mechanism is conceptually the same as staking.

Users stake and lock ALGM in order to get value in return:

1) To receive part of Algem revenue in a form of ASTR and partner dApp governance tokens. 80% of Algem revenue is allocated for the stake to earn pool.
2) To receive veALGM for voting. veALGM holders will be able to vote for:
   a) dApps in Astar dApp staking to stake ASTR via Algem's liquid staking solution.
   b) dApps to supply liquidity (ASTR tokens) from Algem liquid lendings feature and share a part of their rewards.
   c) In which proportions to distribute ALGM incentives between the vaults.

There are several types of staking options, which vary by duration and APR. There is one "free" option for every ALGM user - 10-days staking/locking. To be allowed to stake for a longer period (and get a higher APR) users have to have the slot.

Only users of vaults (liquid lending) have a guaranteed protected slot.

Potential Risks

Liquid Staking & Liquid Lending

The only risk that a liquid staking and lending token can face from a tokenomics perspective is if it is involved in leveraged positions. Liquid staking and lending tokens themselves face no problems, as they are truly backed by 1:1.

1) Algem uses the staked ASTR in order to generate yield in partner apps that might expose them to the risk of permanent loss. Anchor Protocol, for example, used borrowers' collateral in leveraged positions to earn the yield with a high risk of losing the whole collateral or at least part of it.
2) If the users use the adapter contract in order to stake nASTR, then they receive back governance tokens from the respective dApp. If those dApps used the nASTR to enter leveraged positions, then, the protocol could end up in a situation where the total nASTR held by the various dApps is more than the ASTR that was originally staked in the Algem protocol.

Response to Potential Risks

Regarding point 1, the main way to avoid this problem is to either:

1) Avoid this practice altogether.
2) Follow this practice but through more conservative investment products. In this case, the protocol's sustainability will be more exposed to the way the treasury is managed, as market conditions. If the treasury's investment practices are not profitable, or it experiences a "bank run", then the protocol could end up crashing.

Algem commits to taking no leveraged or managed positions with held ASTR, hence point 1 is a non-problem.

Regarding risk number 2, this seems to be impossible, given that third parties dApps can't create new nASTR. The only way to create nASTR is to stake ASTR through Algem. Algem has a special contract which is named nDistributior. This contract control nASTR supply and even if third-party dApps would try to get around and somehow mint new nASTR, the transaction would be reverted because of the balance inconsistency.

Stake to Earn

There is no risk in this process from a token economy perspective. There is no self-reinforcing feedback loop, and the veToken process is well-known and widely used already.

The essence of the veToken model is the locking of its native governance token and getting veToken in exchange which represents a non-transferrable claim on the native governance token, meaning user holdings are illiquid for the locking period. Each holder can choose to lock for as little as one week or as long as four years, with governance power proportional to the length of time they choose.

Many native tokens already include voting rights, however, it has some flaws:

- Controlling the liquidity of native tokens is difficult (dump and pump may happen);
- Governance is simple to game (e.g. instantly purchase a large mount);
- People are more concerned with short-term gains than with long-term interests;
- All of the above may cause community division;

By its nature veTokens as derivatives of native governance tokens are non-transferable and non-tradeable as well it has zero economic value. However, it brings some value proposition to the protocol itself:

- Lock-in reduces the liquidity of native tokens so reduces selling pressure;
- Locked voting rights align the interests of the community (malicious behavior will lead to a decline in the value of native tokens);
- The compensation for locking is protocol revenue distribution to veTokens system participants;[3]

Verdict

There seem to be no internal issues with Algem's token system. Any issues might come from external market forces, which might break the nASTR-ASTR peg. This presents exceptional circumstances and is analyzed later in the marginal use cases section.

Fees

Same as with liquid staking (10% when a user is using the adapter contract) Algem proposes a liquid lending management fee (10% fee on lending reward). While this seems like a reasonable value, there is nothing to suggest that this is the optimal value, and in reality, the system might be able to sustain higher or lower fees, depending on economic conditions.

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[3] *https://www.hashkey.com/en/insights/vetoken-model-and-its-impact*

Marginal cases analysis

The goal of this section is to look at some of the system's edge cases. These are scenarios that, while unlikely to occur, could hinder the system's stability.

Case: ASTR:nASTR peg stability

Lido Finance is the leading liquid staking solution across multiple blockchains, with headquarters on Ethereum. By staking with Lido, your assets remain liquid and can be used across a variety of DeFi applications to earn additional yield. So conceptually the same as in Algem protocol.

However, several prominent protocols were highly exposed to stETH and the Terra-Luna collapse forced companies into huge sell-offs of stETH for ETH. That has been causing slippage in the liquidity pools, which de-pegged by around 5-6% and heavily imbalanced stETH/ETH. The unbalanced pools represented one of the assets, stETH in this case, becoming more illiquid, i.e. difficult to sell due to a lack of ETH liquidity to incorporate sell orders of stETH at current prices.

stETH:ETH Peg Monitor: https://dune.com/dataalways/stETH-De-Peg
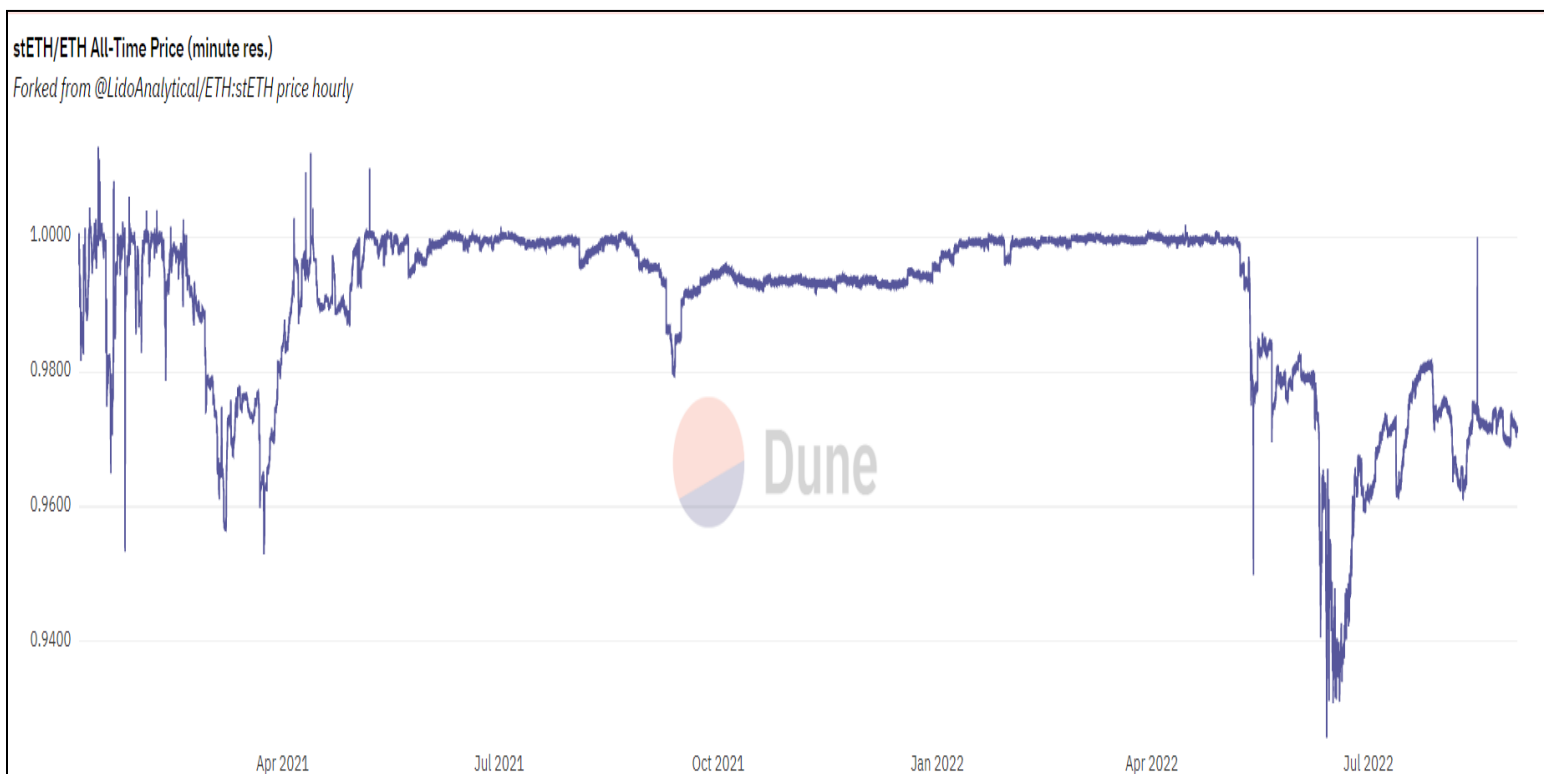
So we can see that external market factors may impact the peg. The exchange rate between stETH:ETH reflects a fluctuating secondary market price rather than the underlying backing of your staked ETH. So the discount poses little risk to people who have only staked their Ethereum and received stETH in exchange. However, traders with leveraged positions, which means they used

their stETH as collateral for a loan, may be at risk if the discount widens enough to force them to liquidate their Ethereum.

Risk mitigation

The same as in the Lido Finance case, on the Algem protocol, there is always a 1:1 ratio for minting and returning nASTR. Regardless of the market's nASTR/ASTR pair ratio. The same amount of ASTR can always be redeemed from nASTR tokens. However, if nASTR holders use their tokens in DEXs to provide liquidity, they risk permanent loss and depeg, just like any other farming in DEXs.

To mitigate this risk, users can use swap, stake, and unstake functions to perform arbitrage strategies between DEXs and the Algem protocol. Users have financial incentives to keep the ASTR/nASTR peg and stabilize the ecosystem in this way.

Token appreciation model

Demand factors

1. Stake ALGM in vaults in order to receive governance token rewards->D_{vault}
2. Stake ALGM to earn revenue->$D_{governance}$
3. Stake ALGM to earn VE tokens->D_{ve}

Supply factors

1. Rewards from vaults (liquid lending incentives) -> S_{vault}
2. Airdrop -> $S_{airdrop}$

All of the above variables are denominated in ALGM.

Hence, in order to avoid selling pressure, the system requires that:

$$D_{vault} + (D_{governance} + D_{ve}) > S_{vault} + S_{airdrop}$$

Per equation of exchange, fair valuation (which primarily serves as a lower bound) is:

$$P = \frac{T*H}{M}$$

Where

M: Total supply of tokens at a given unit of time
H: Average holding time, expressed in the same unit of time as M
T: Size of the economy over the unit of time.

The maximum potential circulating supply of ALGM stands at 100million.

The size of the economy is determined by the demand for ALGM token denominated in fiat or some other token that can be converted to fiat. More specifically, we can define the following variable

Hence we define that:

$$T = (D_{vault} + D_{governance} + D_{ve} - S_{vault} - S_{airdrop}) \$$$

This means that the size of the economy is simply the difference between the supply and the demand, but denominated in $USD.

1) An estimation of the difference between supply and demand at any given point in time.

2) An understanding of the total rewards that can be gained using ALGM at that point in time, denominated in $USD.

Hence we have a limiting price (when all tokens have moved into the circulating supply)

$$P = T\frac{H}{10^8}$$

This is all further investigated within a simulation in Appendix 1.

Distribution

The distribution proposed by Algem is shown in the following table.

ALGM Tokenomic		Supply %	ALGM
Total Supply		**100.00%**	**100,000,000**
Incentives		**50.00%**	**50,000,000**
	ASTR Vaults	*12.00%*	*12,000,000*
	Other vaults and incentives	*38.00%*	*38,000,000*
Team		**18.00%**	**18,000,000**
Early investor		**15.00%**	**15,000,000**
	Investor 1	*1.40%*	*1,400,000*
	Investor 2	*2.857%*	*2,857,142*
	Investor 3	*0.304%*	*304,300*
	Allocation remaining	*10.439%*	*10,438,558*
Reserve		**8.00%**	**8,000,000**
Community growth		**7.00%**	**7,000,000**
	Sirius Finance incentives	**0.10%**	**100,000**
	Kagla Finance incentives	**0.075%**	**75,000**
	Sio2 Finance incentives	**0.10%**	**100,000**
	Starlay Finance incentives	**0.075%**	**75,000**
	Artswap incentives	**0.10%**	**100,000**
	Reserve remaining	**6.55%**	**6,550,000**
Airdrop		**2.00%**	**2,000,000**
	Astar Degens Community	*0.75%*	*750,000*
	dApp staking	*1.00%*	*1,000,000*
	Testnet participants	*0,25%*	*178,000*
	Community activities		*72,000*

The distribution allocation are tested in simulations in Appendix 1. The following conclusions were drawn:
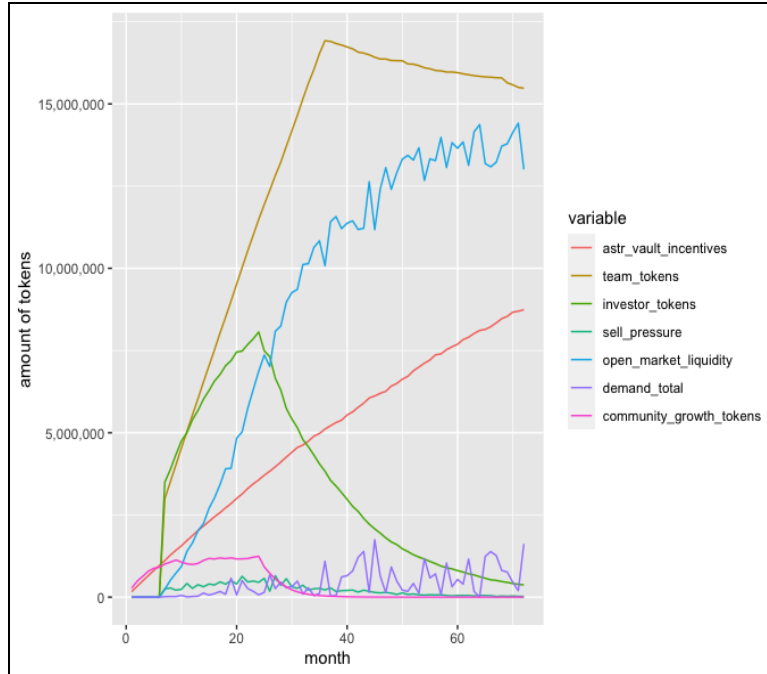
1) ALGM will face the largest pressure during the first two years. These coincide with forecasted economic turmoil in the global markets.
2) After two years, a large part of the tokens will have moved into the market. Algem needs to keep providing incentives for users to buy those tokens and use them.

The conclusions from the simulation led to the creation of two new mechanisms that will further enhance ALGM demands.

More specifically, this led to the creation of staking slots with no governance rights, and lower APY. These slots can be adjusted dynamically (through governance).

Similarly, it was decided that governance will adjust the rate at which ALGM is being emitted.

Finally, there will be a pool of ASTR which will be given to ASTR stakers. This will be a small pool that will be used in the initial stages to further boot ALGM adoption.

All adjustments and changes can be found in Appendix 2.

Simulation 0

Initially, only incentives, team, and investor distribution will be used. Based on the information given, this is what the total amount of tokens looks like, without any selling pressure.
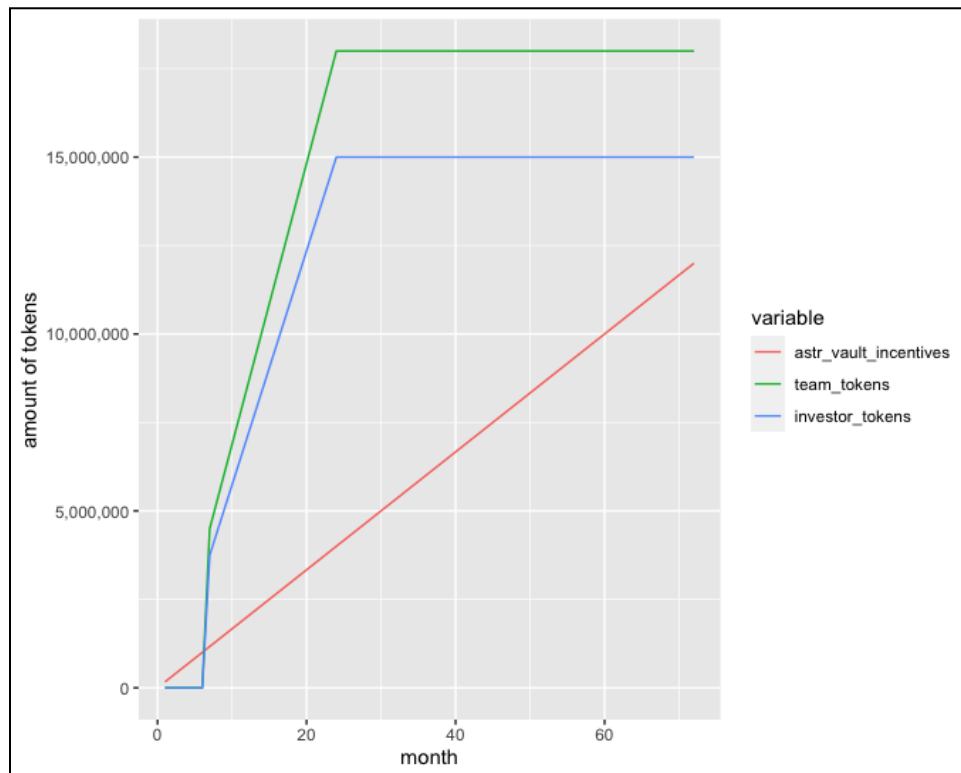
Initial token allocation schedule

### Basic definitions

The time unit is a month.

Sell pressure is defined as follows (for a given segment)

$$amount_{t+1} = amount_t - amount_t * |N(,2)|$$

Where s is a parameter in the range (0,1] that defines the standard deviation of the sell pressure, and mu defines the expected

The term $|N(,2)|$ defines a half normal distribution.

Hence, here's an example. Let's say that at any given point in time, the standard deviation sell pressure for a given segment (e.g. the team) is 10% of the total circulating supply, and =0.2. Then the actual sell proportion for a given month would follow the distribution shown below.
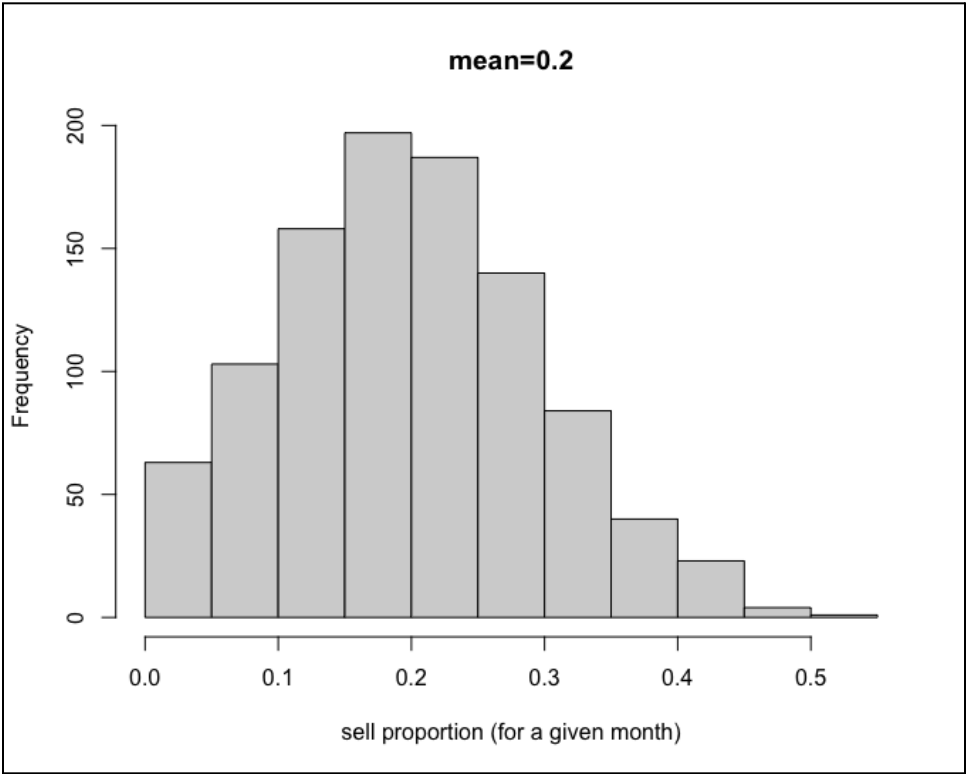
Sell pressure histogram

It's clear that in this model we assume that the sell proportion is constant across time, but the actual amount changes, as more tokens are released. We might want to change this assumption later.

We assume that once the tokens are sold, they move into the circulating supply.

We also assume that while each segment (investors, teams, incentives from vaults) face a different mean of sell pressure, the standard deviation across them is the same. This is done for reasons of simplicity, and we propose to keep it this way unless there is information that would suggest otherwise.

Simulation 1

We assume a low sell pressure from ASTR vault incentives and higher ones from investors and team. Std stays at 0.25

Mean of sell pressure
investor_sell_pressure=0.25
team_sell_pressure=0.2
astr_vault_incentives_sell_pressure=0.05
sell_pressure_std=0.25

Results from a typical run.

The graph shows the total number of tokens in each pool. The exception is the selling pressure, which is indicated only on a month-by-month basis. Hence, for month 20 we can see that the total amount of team tokens was close to 10 million, and the selling pressure for that month was close to 1 million.

Open market liquidity is the pool where all the tokens go once they are sold.
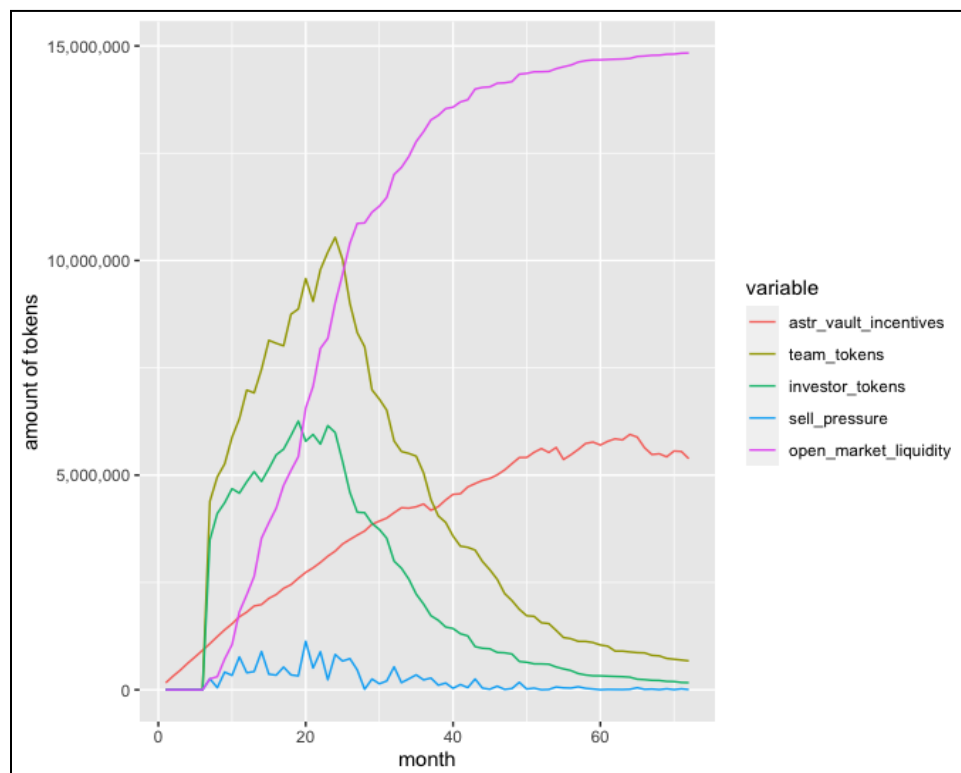
Simulation 1 results

This simulation does not accommodate tokens being sent back into the vault. This is done in the next simulation.

Simulation 2

The second simulation is more advanced. It adds an extra process to the first one. After the sell pressure calculations, we calculate the demand for ALGM from the open market. This demand is trying to buy ALGM in order to provide it to vaults, or for staking and governance.

Once the demand is satisfied, it's removed from the market liquidity.

Once again, the demand is defined by a half-normal distribution. The parameters for the case below were:

demand=0.05
demand_std=0.1
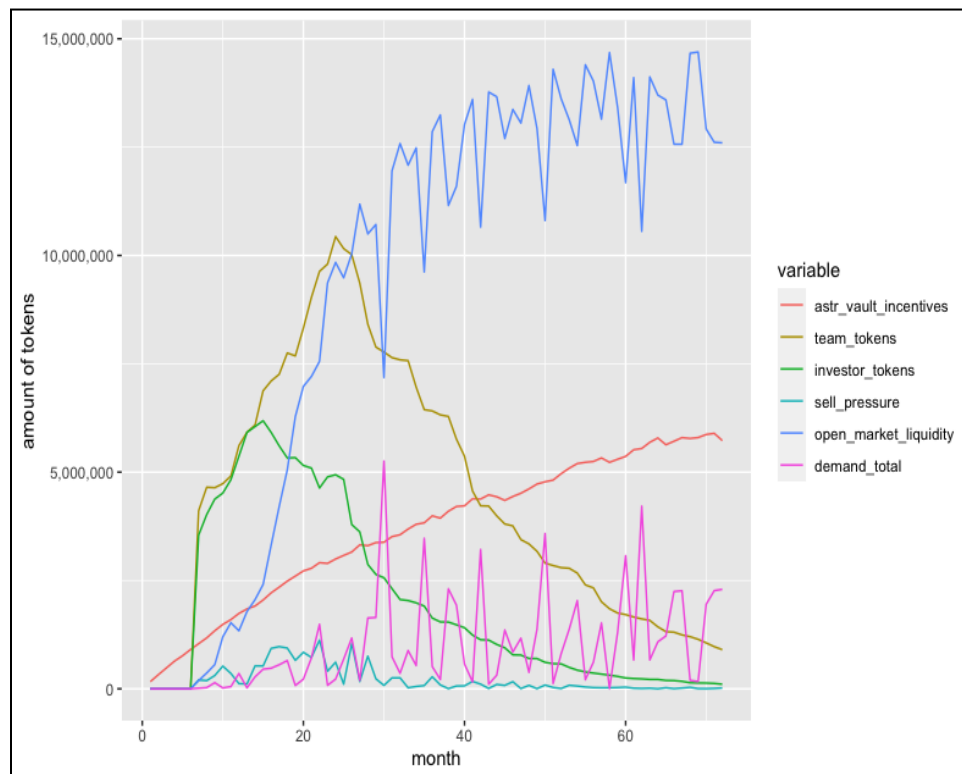
Simulation 2 results

Price Simulations

Using the equation of exchange, we can run a simulation of what would be a fair price for the token.

This is simply defined as

$$price = \frac{T*H}{M}$$

Where T is the size of the economy in fiat, M is the total circulating supply and H is the holding time.

We also need a starting price for the token, which in this case was set to $0.01

Holding time is set to 6 months. That is, the average user holds for an average of 6 months.
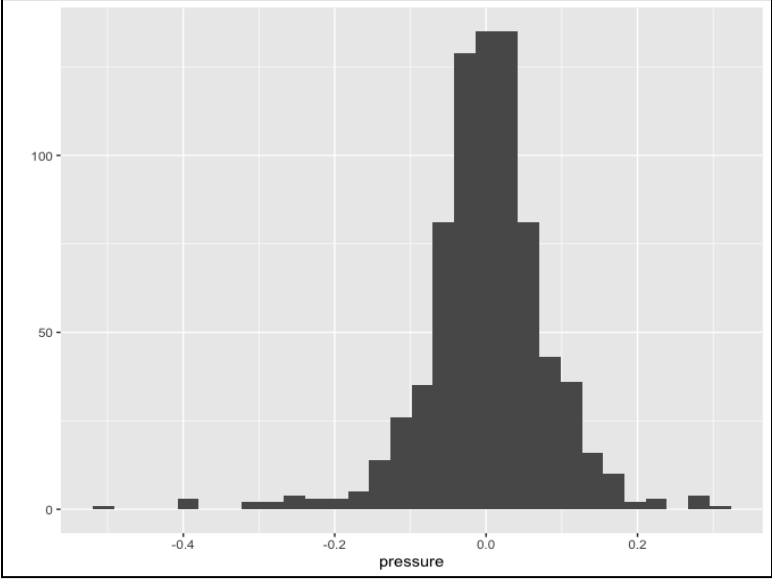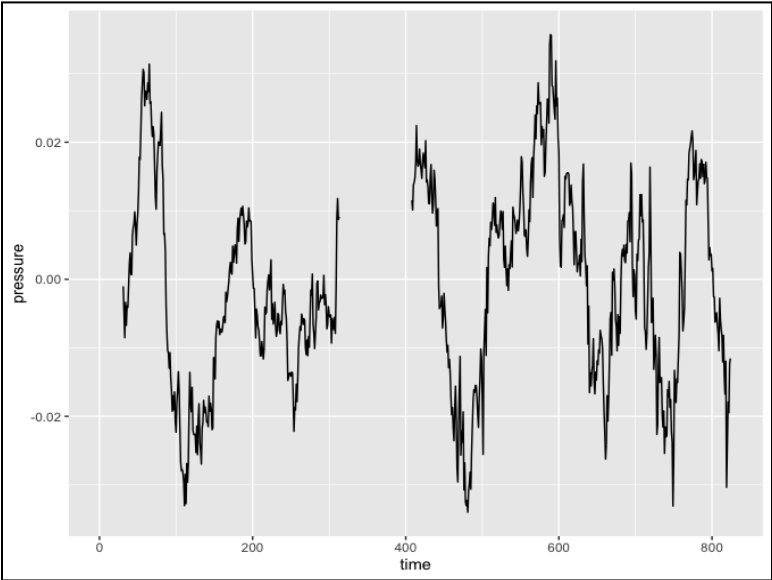
Demand and sell pressure simulations

In order to come up with a realistic figure for the demand pressure, we collected data from different protocols. We calculated this quantity as follows:

1) Get the daily market cap. Let the market cap at a given day n be c_n
2) Calculate the first order difference d_n
3) Calculate $\frac{-d_n}{c_n}$

We can then take the 30-day rolling average, in order to smooth out the time series. We get the following results.

What our research indicates is that the pressure is essentially a random walk. It follows a standard normal distribution. The standard deviation of ETH is close to 0.05, so we use that in our simulations.
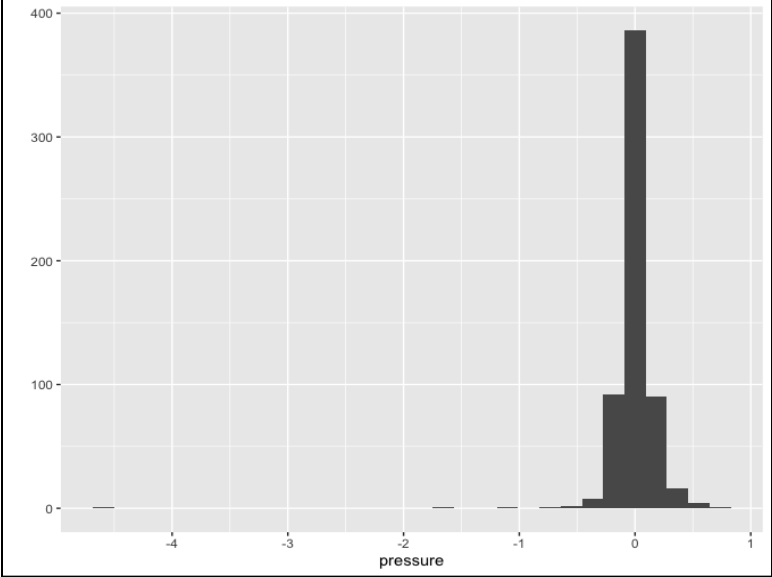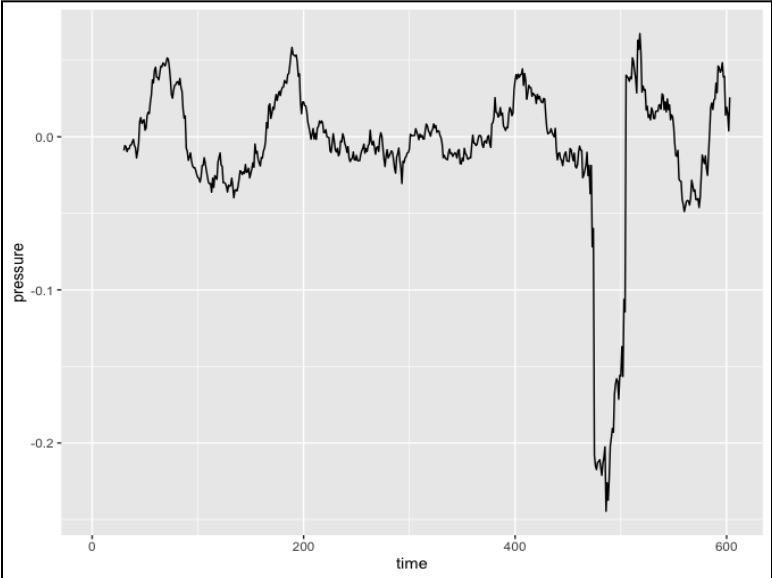
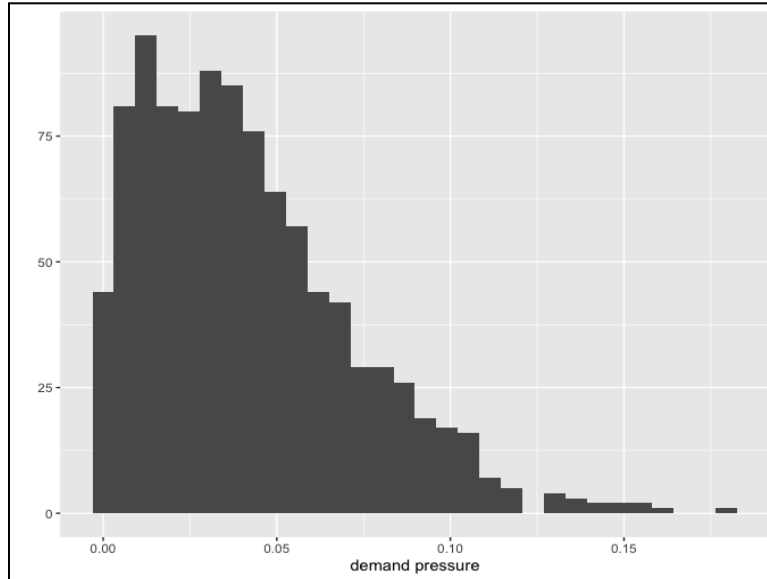# Rocket Pool Demand Pressure
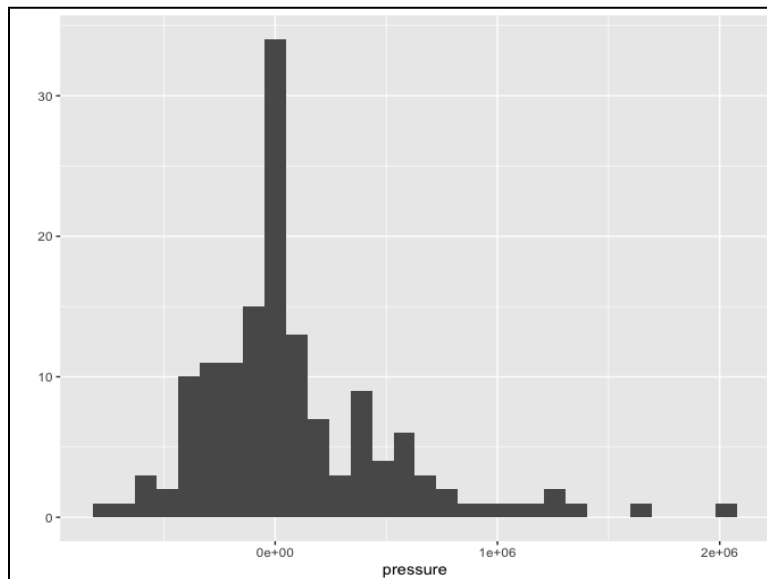
ETH Demand Pressure
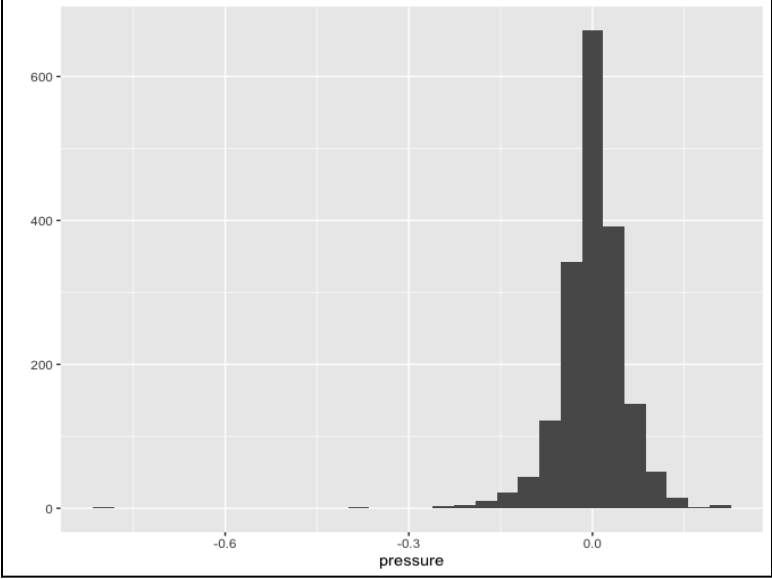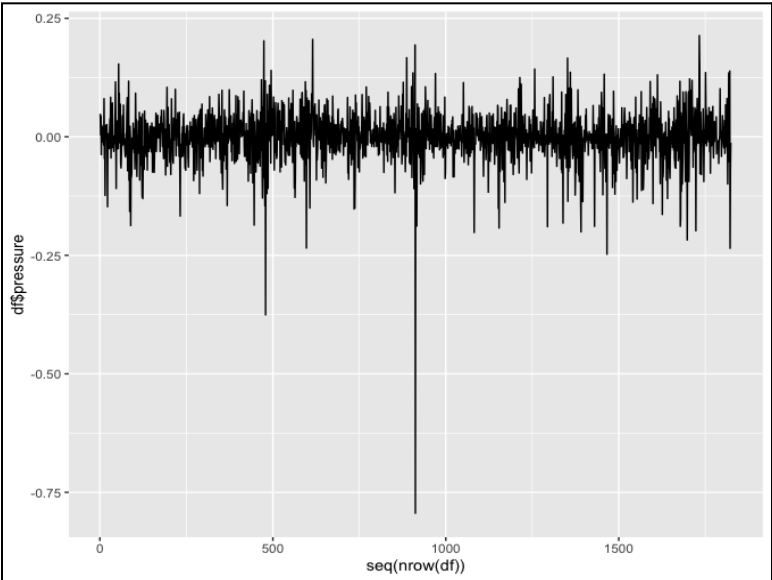
Lido Finance Demand Pressure

Simulation 3

Simulation 3 was like simulation 2, but we used demand pressure which was sampled from a half-normal distribution with std=0.05.

Demand pressure simulation histogram

So, when we put the selling pressure and the buying pressure together, we get a shape that approaches normal with wider tails


Demand and selling pressure simulation histogram

We can't just use a normal distribution for sell pressure, because we've decomposed it in a more detailed way, based on where the supply is coming from. However, the previous histogram demonstrates that our assumptions match what would we would expect to see in real life.
We also added 9 million tokens for community growth and airdrops, with a 2-year vesting schedule.

So, we had the following parameters:

investor_sell_pressure=0.25
team_sell_pressure=0.05
astr_vault_incentives_sell_pressure=0.1
community_growth_sell_pressure=0.5
sell_pressure_std=0.05

Based on that we get the following results:
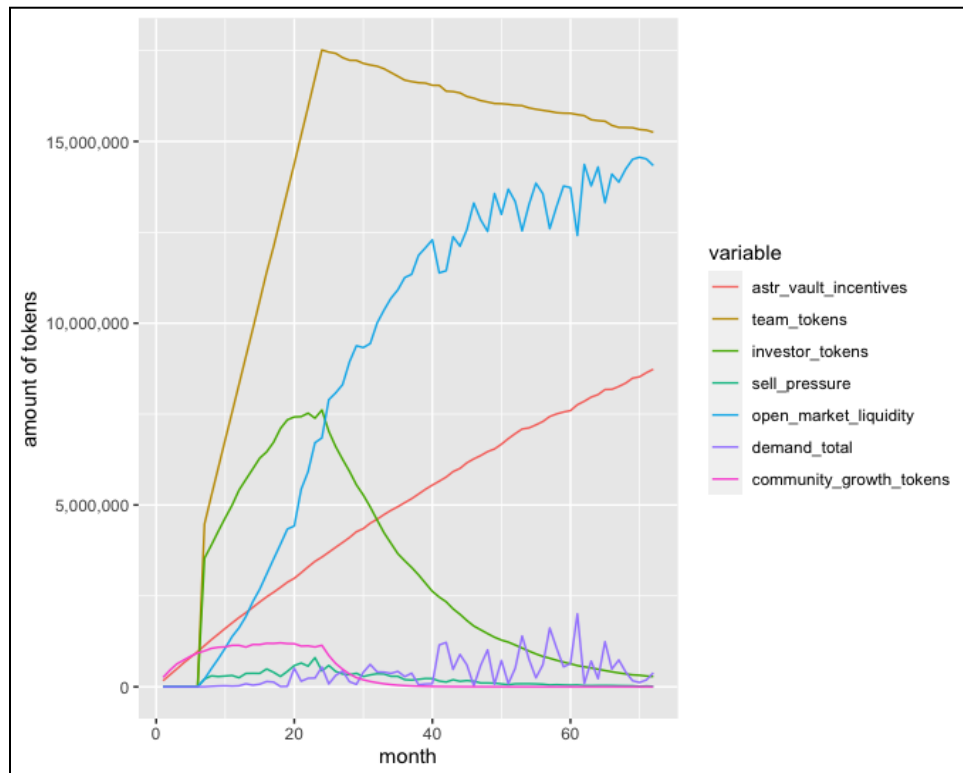
Simulation 3 results

Note that the equation of exchange is simply a model which is useful in determining a lower bound for a price, and in practice the market conditions will exert a huge influence. What is encouraging is that the price holds its level. **There doesn't seem to be anything in the distribution that would suggest that the price is going to crash.**

Simulation 4

Like simulation 3 but used a team vesting schedule of 3 years
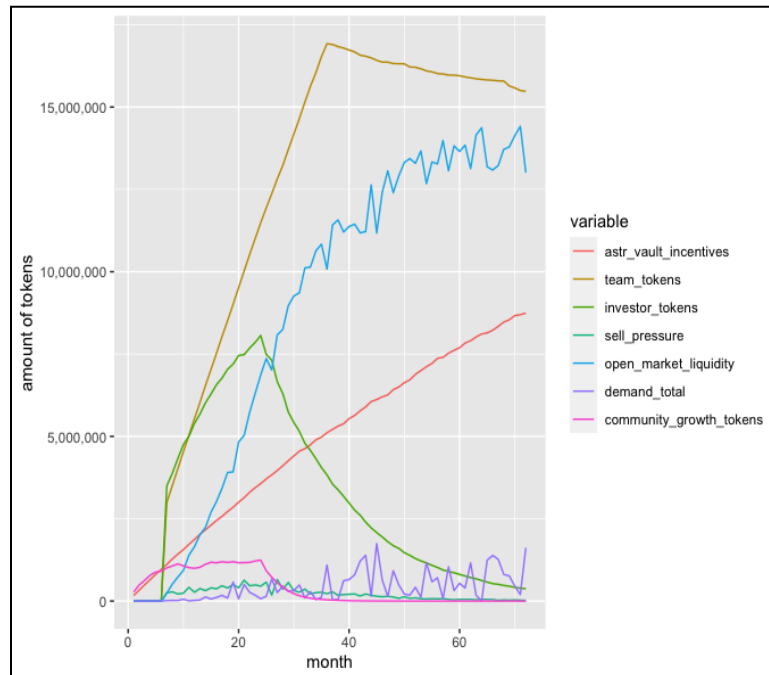

Simulation 4 results

The results confirm what we said earlier. What is very important to do, is to ensure that by the time the total open market liquidity has reached a certain size that surpasses the other pools, there are enough incentives to buy the token and hold it.

The current holding time (as discussed) was 6 months, but this could easily go up depending on the vaults being released.

Maybe Algem should also consider some automatic staking options, so users get ALGM, and they are automatically staked somewhere else. Hence, the ALGM is not sold but circulates within the project's economy. This also counts as "holding time" for the model, since ALGM is not exchanged for USD, and hence there is no sell pressure.

Addendum: alternative estimation of price

The calculations above used the total amount of tokens in circulation. This makes for a pessimistic estimation of the price since we assume that all tokens that have been sold could participate in the selling pressure. If we use only the simulated sell pressure at a given month, then we come up with a more optimistic price estimate, as seen below. This should be taken as some kind of upper limit on the price.
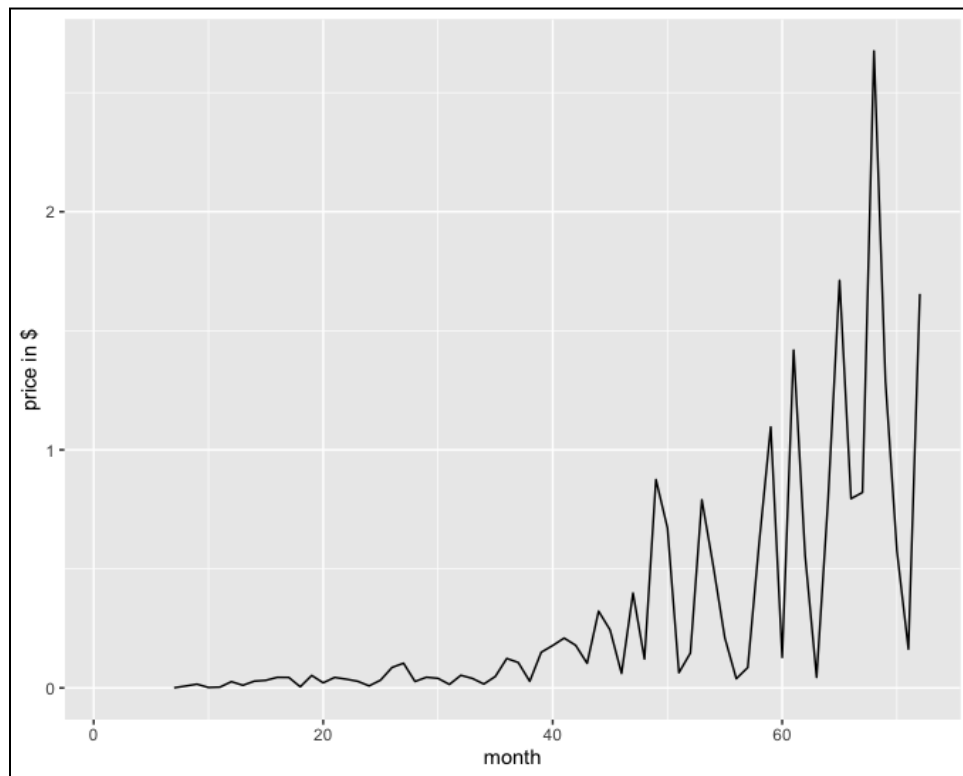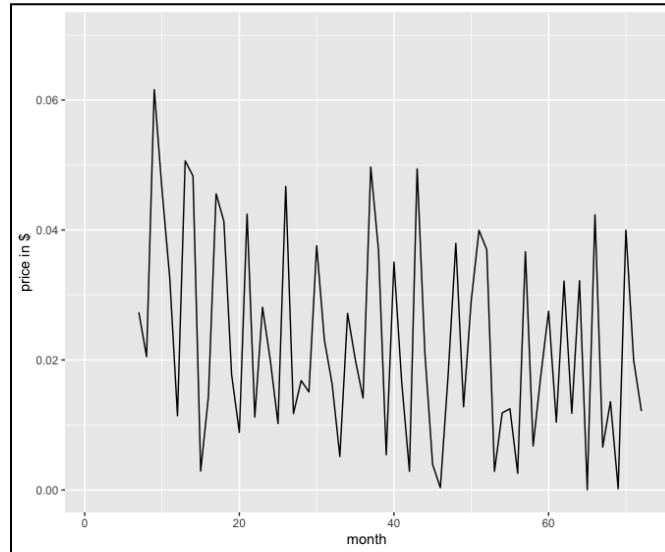

Alternative price simulation, which shows wider volatility and appreciation.
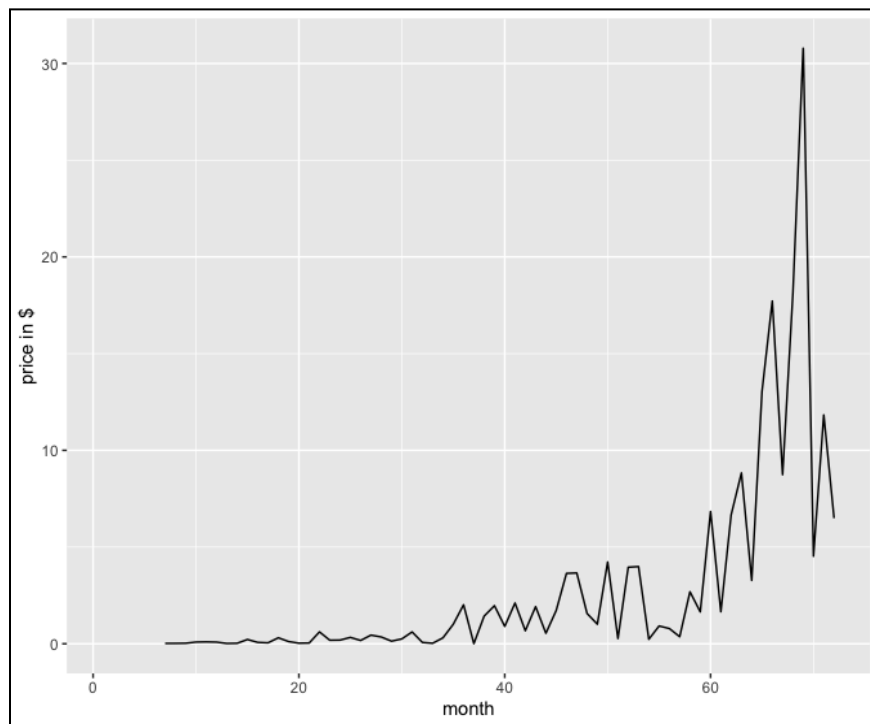
Simulation 4.1

The same simulation as simulation 4 but with a starting price of $0.07.

Pessimistic scenario

Price simulation. This graph has to be taken as an effective lower value or fair value on the price ($0.07 price).

Optimistic scenario

Alternative price simulation, which shows wider volatility and appreciation ($0.07 price).

Adjustments and Changes

- **Equations, which define rewards in Liquid Lending were changed:**

A simple linear rewards distribution model was updated to:

$$rewards_{algm} = \frac{user_{algm}}{vault_{algm}}$$

$$rewards_{govtoken} = a * \frac{user_{algm}}{vault_{algm}} + (1 - a) * \frac{user_{astr}}{vault_{astr}}$$

- **Vesting schedule of the team is increased:**

Investors and team vesting schedule were the same. Algem increased the team schedule by 1 year (from 2 years to 3 years).

- **Additional mechanisms to reduce token velocity were added:**

To limit selling pressure Algem will provide an access to the staking to users who don't have the slot and introduce "free" slots[4].

- **Additional APR bonus for the auto compounding of the ALGM incentives.**

- **Updated staking slots mechanics based on specific goals:**

1) Incentivize participation.
2) Prevent whales from acquiring all slots.
3) Increase demand for ALGM.

- **ALGM incentives linked with users and ASTR supplied through the vaults:**

Algem has allocated 12 000 000 ALGM for the ASTR vaults over the 6 years or 2 000 000/year and 5480/day. Initially, Algem will have a small number of users and they would get the same number of rewards/daily as a way higher number of users several months later. Inflation would be disproportional in comparison with the number of users.

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[4] "Free" slots will have 10-day unstaking period and will not give voting rights. These slots are generated via governance. It's impossible to get this slot through the action or somehow else. When a user unstake ALGM, this slot is burned.

Instead, Algem will decide the number of daily incentives via voting and begin with e.g. 1800 ALGM/day instead of 5480. With the growth of the user base, the governance community will conduct voting to increase this number. This number will rise until it reaches 5480 ALGM / day.

With this approach Algem will achieve several goals:

1) Algem will decrease inflation in the early stages of Algem.
2) The APR in vaults will not decrease with the growth of the user base and TVL because Algem will increase the number of incentives via voting.