



# Plasma

A comparative analysis of  
risks and solutions

Λ X V | 2023

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# Overview

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# Introduction

The purpose of the materials herein is to provide a comparative analysis between Astrovault and Curve, a well known stable swap. The materials will compare and contrast the risks faced and the solutions offered to highlight the key factors that differentiate Astrovault from its competitors in the market.

# Goals



## Curve

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Built to enable consistently cheap swaps between stablecoins.

## Plasma

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Built to address the inherent issues in derivative liquidation ([as outlined in our Whitepaper](#)) and enables a cheaper way to exchange stables as a by-product.

# A closer look

## Curve

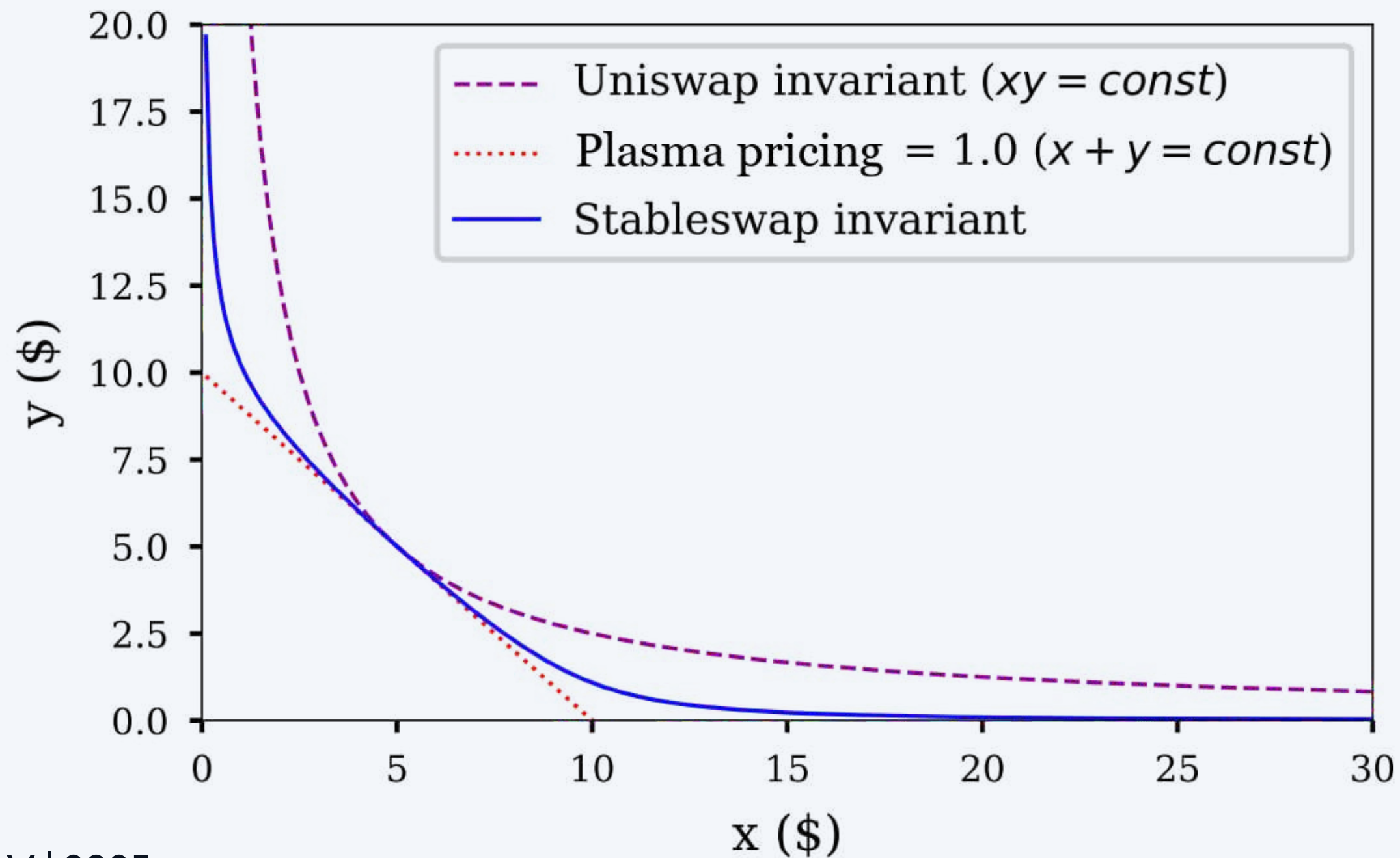
- Consistently near-zero slippage
- Customizable ranges
- Net trade fee of 0.04%
- Deposit & Withdrawal fee for single side LP
  - Protects them from 'free trades'
- Print-on-demand Tokenomics

## Plasma

- Fluctuating trade fee instead of slippage
- No Customizable ranges
- Net trade fees are near 0
- NO\* Deposit & Withdrawal Fee
  - Trades are usually free anyways!
- Works BETTER unbalanced for derivatives
- All fees retained as Protocol Owned Liquidity for sustainability

# Comparing 1:1

Next, let's look at a comparison of Plasma's 1:1 pricing mechanism alongside that of Uniswap & Curve:



## Risk

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The issue with a fixed 1:1 rate is that it opens an attack vector for pool depletion. In order to protect pools from depletion, we created our formulaic exponential trade fee. This fee functions similarly to the StableSwap invariant, with the exception that without pricing changes, pool-balancing arbitrage is not inherently profitable without additional incentives.

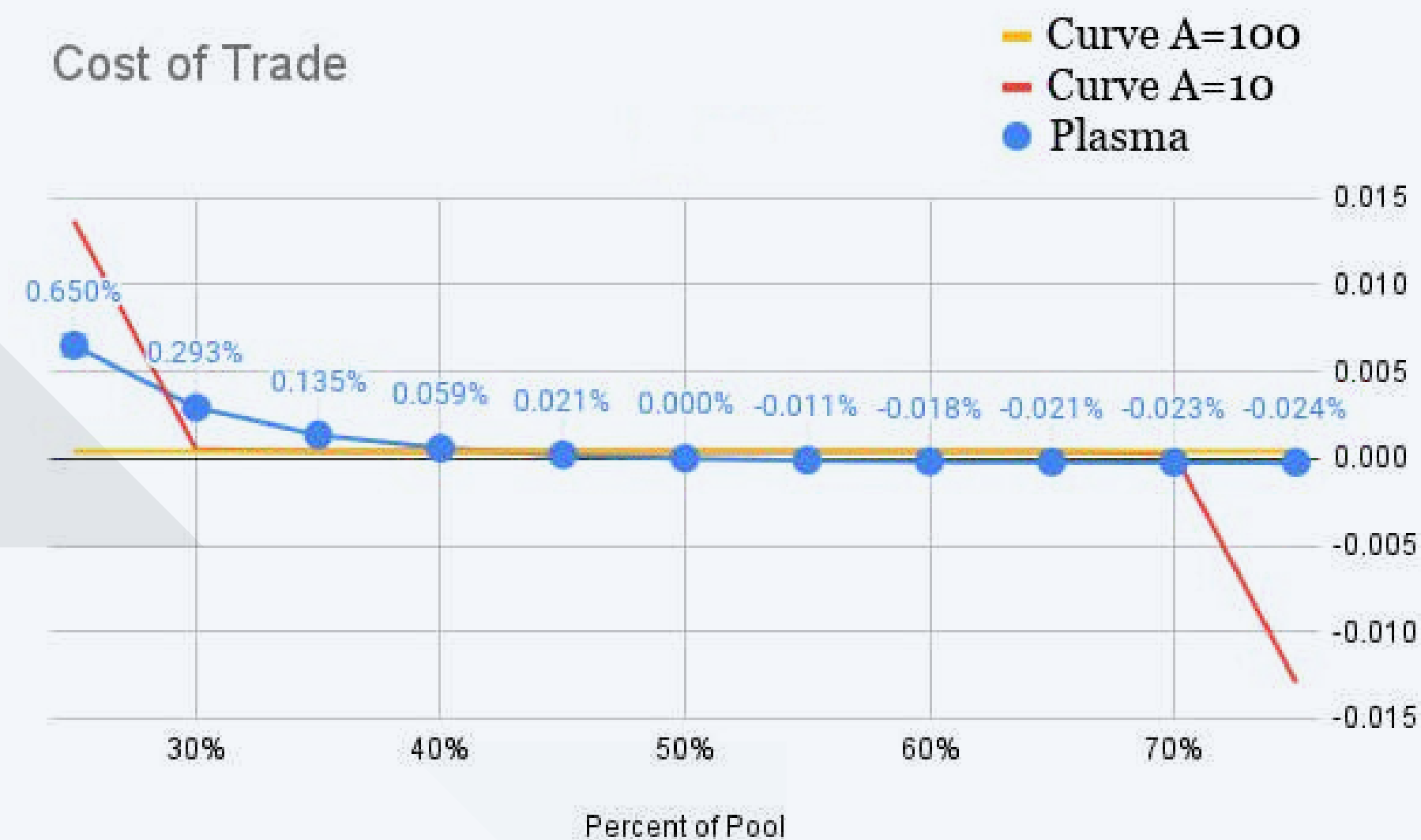
## Solution

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In order to facilitate profitable arbitrage, we've created GRVT8, a safe and dynamic trading incentive. With the added incentive to drive volume, arbitrage bots become lucrative and the DAO continually captures value from these interactions by locking all Plasma Pool fees in as Protocol Owned Liquidity. Automatic arbitrage will also be performed by the DAO Treasury.



# Comparing trade costs



In general, when within balance tolerance, Plasma trades cheaper than any Curve pool due to a Net Trade Fee of 0, compared to their 0.04%.

Only **strong** unbalancing will change this.

# Examining xDerivatives

The chart to the right comes from page 3 of our Whitepaper. This is a breakdown of fees based upon whether the interaction is balancing or unbalancing and to what degree. Keep in mind that GRVT8 also awards AXV to traders. This is expected to be worth 0.055% and acts as a kind of subsidy on trades, achieving a Net Trade Fee of 0 in a lot of cases. Additionally of note, a pool must be **severely unbalanced** beyond a ratio of 3.45 to 1 before the fee will exceed even 1%.

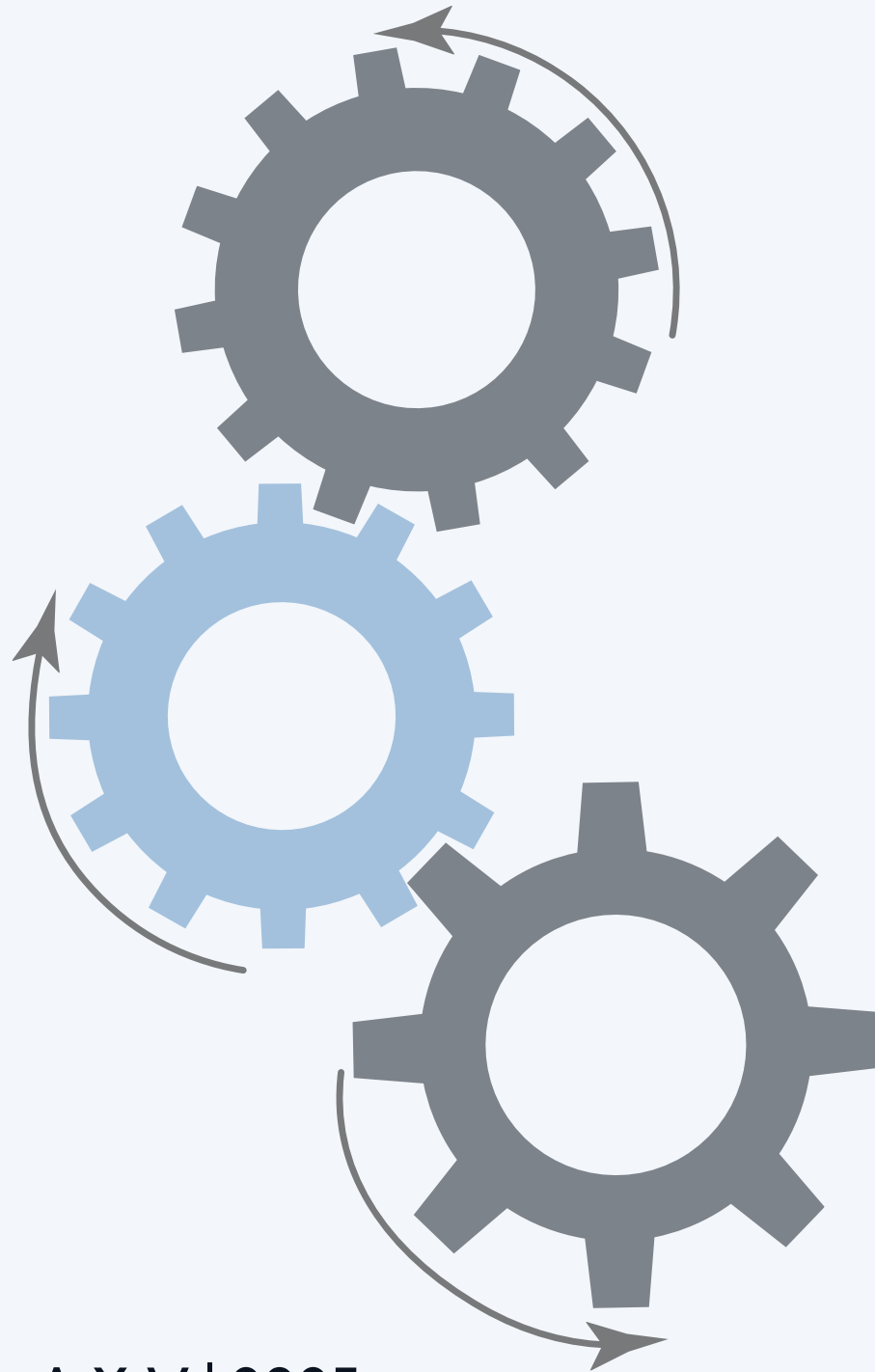
Table 1: Typical balancing and unbalancing fees for a 2-token pool

Pool Breakdown	Balancing	Unbalancing
50/50	0.055%	0.055%
45/55	0.044%	0.076%
40/60	0.037%	0.114%
35/65	0.034%	0.190%
30/70	0.032%	0.348%
25/75	0.031%	0.705%
20/80	0.030%	1.630%
15/85	0.030%	4.579%
10/90	0.030%	18.260%
5.93/94.07	0.030%	100%

# Organic bonds: a quick primer

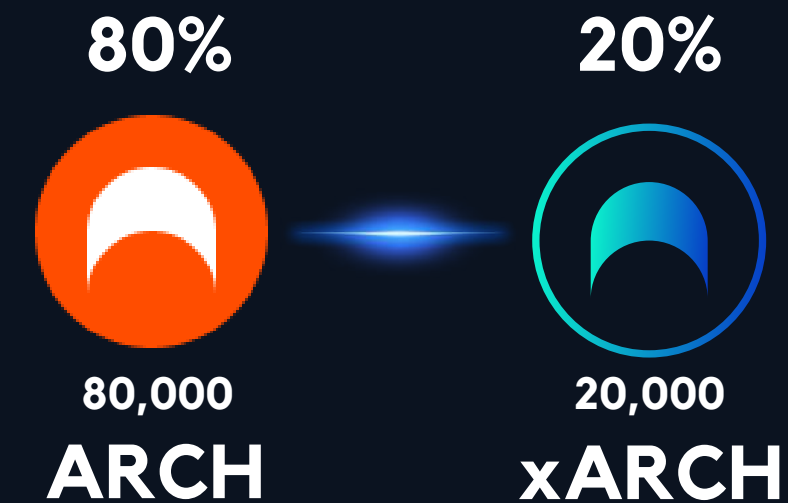
## Plasma Trade Fees + GRVT8 = Organic Bonds

Trade fees in the Plasma pool go to the DAOs Protocol-Owned-Liquidity, and LPs are instead rewarded with AXV from emissions, in essence trading the governance token for POL, like bonds, but organically and dynamically through the usage of the protocol.



# Lets look at some examples

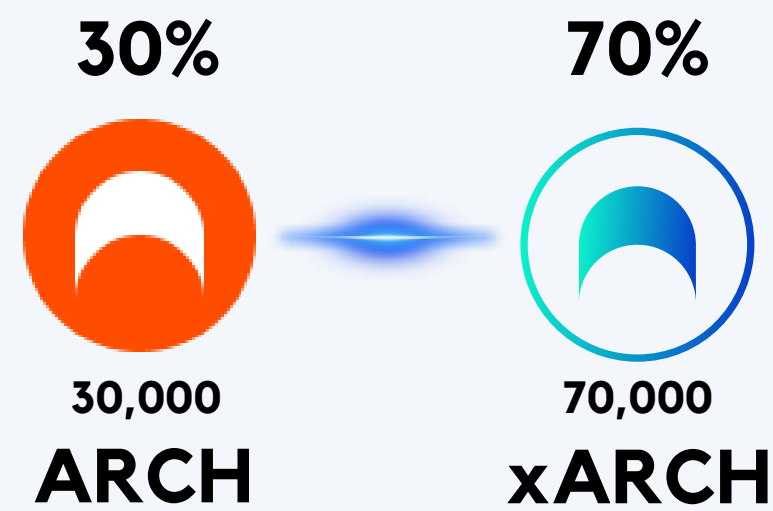
In this example, the pool has 80% ARCH and 20% xARCH. A trade from xARCH to ARCH would have a Net Trade Fee of -0.025%. If we were to go the other way, the Net Trade Fee could be 1.575%, but the logic will determine that minting is cheaper and automatically mint, avoiding the fee altogether.



xARCH to ARCH  
NTF = -0.025%  
ARCH to xARCH  
NTF = 1.575%?  
**NO! xATOM is MINTED**  
instead!



When there are more native assets than derivatives, there is never a net trade fee!



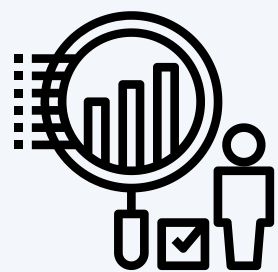
ARCH to xARCH

NTF = -.023%

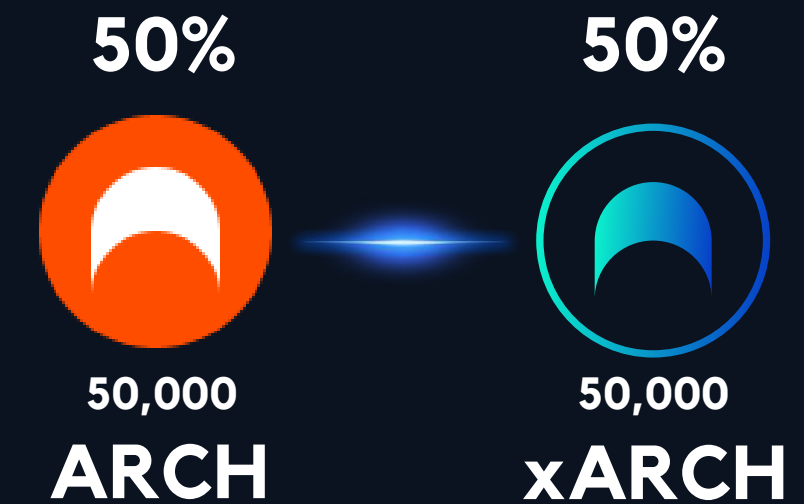
xARCH to ARCH

NTF = .293%

Here, the pool has 30% ARCH and 70% xARCH. Since the pools are imbalanced, the Net Trade Fee would indeed be .293%, however, the DAO can balance this pool by withdrawing the 40,000 difference in xARCH to our  $x*y=k$  Nebula pools!



By balancing derivative pools, the DAO can help manage trade rates and the expansion of liquidity into more diverse pools, where desirable



ARCH to xARCH

NTF = 0%

xARCH to ARCH

NTF = 0%

In this example, the pool has 50% ARCH and 50% xARCH. Since the pools are balanced,, GRVT8 will cover the .0055% trade fee, so the trade willl work out to be free for the user.

# Potential risks

## GRVT8

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GRVT8 is not an infinite printer, rather it fairly allocates a set percent of inflation to traders. If there's significant volume without corresponding price appreciation, it is possible that the net trade fee could be less than 0.055%, but in that case the protocol could always raise its percent of inflation to mitigate this. With this design, we expect this to act as a floor for volume.

## Removing Liquidity

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IF users could always trade for free, and instantly remove xDerivative assets whenever they outweighed their native counterparts, it could cause a continuous arbitrage that would significantly reduce the liquidity. For this reason liquidity will be managed through governance, or fixed ratio parameters (such as 70%). If there is ever a situation where there ISN'T enough liquidity, users can still choose to unbond and will be subjected to the 21-24 days unbonding period.

# Bootstrapping liquidity

## How do you get liquidity?

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We intend to bootstrap liquidity directly for the native assets from protocol teams and Community Pools. Plasma pools, as demonstrated earlier, function perfectly fine with only the native asset since trading or swapping the other direction will result in an xDerivative being minted.

## What if they say no?

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If a Plasma pool is NOT seeded, an xDerivative can still be added to the Nebula Pools. In this scenario a Plasma pool will be created, and seeded through emissions.

In the absence of seeded liquidity, it will simply take time for the emissions to reach a threshold where the pool is liquid enough to justify the fees for bypassing the unbonding period when removing assets.



The following is an example partner pitch given to a group that has agreed to seed significant liquidity on Astrovault, as it simply presents the most cost effective and sustainable solution for liquidity hosting services

## Osmosis



- Pay \$500k
- 3 Months
- Paired against farm token
- NO supported liquidity
- NO supported growth

## Shade



- Pay \$250k
- 6 Months
- Paired against farm token
- NO supported liquidity
- Not friendly to new users

## Astrovault



- Pay \$0
- **FOREVER**
- Paired against any token ARCH, ATOM, etc.!
- \$500k in supported liquidity
- Ecosystem support
- Easy onboarding



# Modularity vs. practicality

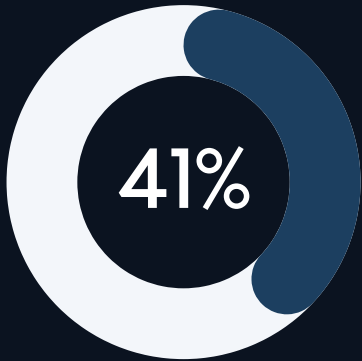
Curve has more composability on their leverage, and functions better when unbalancing beyond 41%, but Astrovault is cheaper for the other 59% of the liquidity range, generally achieving free trades.

Pool %	Unbalance Fee
50/50	0.000%
45/55	0.021%
40/60	0.059%
35/65	0.135%
30/70	0.293%
25/75	0.650%
20/80	1.575%
15/85	4.524%
10/90	18.205%
5.93/94.07	99.945%



## Astrovault

Astrovault consistently provides the most affordable option for settlement and presents a sustainable alternative with a proper business model.



## Curve

Curve can change more parameters per pool but fails to provide the sustainability required to present a long term solution.

# De-peg events

## Curve



LPs are exposed to all assets. During a de-peg, LPs are all hurt, and CRV is printed-on-demand to try to lessen the pain, unsuccessfully.



## Plasma



LPs are exposed to all assets. During a de-peg, LPs are all hurt, but the AXV DAO earns the higher trade fees, and earns USDT, USDC, and DAI for the DAO treasury!

LPs are at risk during a re-peg. This is inevitable. BUT, with O-NTF trades, it's easy to fragment pools to mitigate risk to core LPs. This strategy still enables us to bootstrap USDC liquidity for new stables, without putting the core pools at risk.



# Examples

## Stable 1

USDC	\$10M
USDT	\$8M

## Stable 2

USDC	\$1M
IST	\$800k
USK	\$650k

## Stable 3

USDT	\$1M
CMST	\$800k
BUSD	\$1M

## Rewards

AXV

BLD & KUJI,  
potentially AXV

CMDX

The core stable pool wouldn't be at risk from an IST, USK, or CMST depeg. Other stables will be asked to provide independent incentives if they want a featured Plasma Pool. Users could bring USDC there if they like the potentially higher rewards and are willing to assume the risk.

A trade from USK to USDT would route USK - USDC in STABLE 2, then USDC - USDT in the STABLE 1 pool. The NTF would still be about \$0.

We already have a core dapp "Shark Bank" that will LP in the STABLE 1 pool, assuming less risk

Again, the purpose of our Plasma pools are to liquidate derivatives efficiently, enabling Astrovault to earn significant Protocol-Earned-Liquidity and external revenue which will allow the protocol to accrue true intrinsic value to the AXV token. The Stable Swap is a byproduct, but still provides more efficient swaps than Curve under normal circumstances.

Curve is also plagued by poor tokenomics that include print-on-demand ability and  $ve(3,3)$  tokens which gamifies governance power in order to kick sell pressure down the road due to the fact the protocol does not have the revenue or underlying treasury to justify their valuation.

All of the current developments with regards to  $ve(3,3)$  and concentrated liquidity are merely tokenomic tricks to try and delay the inevitable sell pressure. In essence, they're gimmicks. Astrovault will be run as a business. Competitors cannot remotely compete with our liquidity service offerings. We don't need  $(3,3)$  'Game Theory' to prevent sell pressure or to lock in value because we actually capture the value that we create.

# Solutions to Plasma risks

## Unbalancing (trade)

Goal: Protect Plasma pools from depletion, which is an inherent risk in constant-pricing models.

Considerations: Need to discourage depletion of the pools through scaling fees, while still providing profitable arbitrage mechanisms to incentivize pool balancing activity.

Solution: Replace slippage with a formula that resembles a StableSwap invariant but functions as a fee, paid to the DAO as POL. Create GRVT8 as a means to perpetually incentivize traders at a rate higher than the minimum trading fee, making the act of balancing pools generally profitable.

## Cond. unbalancing (LP)

Goal: Protect Plasma pools from depletion through the removal of liquidity in ways that further unbalance.

Considerations: We don't need Curve's constant LP fees because using this to free trade is fine, trades are already free. We only need this to prevent unbalancing.

Solution: Have the unbalancing fee only trigger at a point in which it's hurting the utility of the pool and future traders. Anybody can avoid it by withdrawing the other token. Creates risk of unbalancing to that threshold: (see soft lockup)

# GRVT8

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Goal: Incentivize traders & volume in a way that is dynamic and safe for the protocol

Considerations: Print-on-Demand tokenomics are too risky, not dynamic, and it's otherwise impossible to reward volume proportionately. Incentives are needed to encourage balancing of Plasma Pools.

Solution: GRVT8 is built as a 'credit token' to distribute AXV properly to traders. Scripts regularly update pricing data to closely mint 1 GRVT8 per \$1 traded. Trade volume is an independent variable, but a fixed rate of AXV is distributed to traders. No exploit could expose a random mint.

# Soft Lockup Fee

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Goal: Protect Plasma pools from being unbalanced up to the point where a 'Conditional-Unbalancing-Fee' would trigger, as an attack vector. This attack wouldn't be profitable, but would otherwise exist as a possibility.

Considerations: We don't like arbitrary liquidity lockups. We also don't want to add risk/concern to DAOs who seed Plasma pools.

Solution: The Soft-Lockup Fee is cheap, but can be bypassed by Whitelist for institutional customers, protecting the pools from this niche attack vector.

# Solutions to DeFi risks solved by Astrovault

## Derivative liquidations

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Problem: If using stAtom as collateral for a loan, you could be liquidated even if the price of ATOM remains constant.

Considerations: Auto-compounding derivatives inherently trade for under their intended price (section 6 of our whitepaper), better oracles can't solve this

Solution: Using xDerivatives as collateral enables direct pricing of ATOM rather than xATOM. No new or special oracles are required, and ATOM staking rewards can be relayed Astrovault to the lending protocol to enable compounding, or they can make their own synthetics, which require Plasma!

## AMM tokens don't retain value

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Problem: Revenue generated on AMMs is for LPs, nothing for token holders.

Considerations: Current "Best Practices" of AMM tokenomics, like ve(3,3), still can't bypass the fact that liquidity is the denominator of 'Real Yield', and no revenue is generated by traditional DEXs.

Solution: Utilizing xDerivatives enables the DAO to earn revenue directly from Astrovault's liquidity. This solves long-term liquidity problems without bonds, adds dividends without voluntary contribution, and allows for codified buy pressure through Nebula fees.



# Regulatory compliance

## Utility/Dividends

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Current: Governance Power is currently enough to justify staking rewards, and the AXV token governs not only Astrovault parameters, but also other L-1 protocols.

Considerations: It is possible that regulation will change, making AXV dividends (stake AXV to earn ATOM and vote in ATOM proposals) a security.

Solution: If this happens, we will deprecate the current staking/governance pools, migrate ATOM voting power to the AXV-xATOM LPs, as well as the 20% of ATOM staking rewards.

## Buybacks/Burns

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Current: AXV has automated buybacks/burns, but tokens with manual buybacks/burns could be considered securities.

Considerations: What if they made automated buybacks and burns securities?

Solution: We believe this should remain safe, but if it doesn't, we would lessen the emissions equal to buyback and replace with bought tokens. A time-locked address is always an option in place of full burn.



# Tax compliance

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Current: We're partnered with Xavier Capital and Gordon Law Group to build tax reporting software directly into our platform.

Considerations: It is possible Decentralized reporting and KYC/KYB becomes mandatory.

Solution: We aim to make reporting compliance available to all countries in native languages, but not manually enforce anything. We can otherwise use 'Referral-as-a-Service' to sponsor alternatively hosted front-ends through Archway's premiums if we need to geofence.

# DAOception

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Current: AXV will have significant governance power in other L-1s, including but not limited to Archway.

Considerations: Growing too big makes Astrovault eventually a threat to any of the L-1s it supports.

Solution: This is one of the value props of the AXV token! We've seen some of this through the Curve wars with Convex, but not at the scale of Astrovault. We encourage L-1s to adapt ATOM's 'split voting' model to lessen the threat, but we'll tread carefully, and watch out for things like Juno's 'Prop-16'.

# Conclusion

The biggest risk in this model is that all of the tokens we earn in our treasury (ATOM, ARCH, etc.) lose their valuations, lowering the value of our treasury and revenue. While we view this as unlikely, it strengthens our resolve to collaborate, contribute, and be active participants in every community we support, helping them with marketing and product-market fit to ensure mutual success.



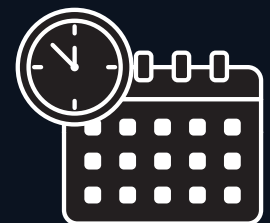
We are thought leaders at the forefront of tokenomics and regulatory compliance advising and audits. Eric regularly lectures Masters courses in Tokenomics, and has been featured multiple times on CoinTelegraph and Forbes. We are uniquely positioned to understand and anticipate potential risks of our models, and others.

It's simple enough to align incentives, but true game theory involves aggressively 'red-teaming', or identifying how models could be broken, and quantifying how expensive attacks are to pull off. From a game theory perspective, Astrovault is ironclad. It can only be slowed down temporarily (unbalanced), however, the AXV DAO would profit substantially from any such instance.





# Thank You



[Schedule a meeting!](#)



[Reach out to us on Telegram!](#)

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