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An Analysis of the Role of Vote Buying in DAO Governance

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Introduction

In recent months, vote buying has become one of the most widely debated practices in DAO governance. What was once a theoretical or informal occurrence has now been formalised through platforms such as LobbyFi and Event Horizon. These systems provide onchain marketplaces where voting power can be bought and sold, introducing a new layer of strategy and incentives into governance participation.

Proponents view vote buying as a means to activate passive token holders, increase voter turnout, and improve efficiency. Critics worry that it introduces risks around fairness, undue influence, and trust in decentralised processes. As these mechanisms gain traction, the need for a clearer understanding of their implications technical, social, and economic becomes urgent.

This report offers a neutral, in-depth examination of vote buying as it relates to DAO governance.

We structure this report across three main areas of focus:

1. Mapping the landscape and state of vote buying in DAO governance

This section provides an overview of the current state of vote buying in DAO governance, examining how the practice has emerged and evolved. It analyses the major platforms facilitating vote buying today, including LobbyFi, Event Horizon, and others. Their models are classified based on key dimensions such as mechanism design, accessibility, transparency, and governance risk. Structural differences are highlighted through a comparative matrix to better understand the varied approaches and implications across platforms.

2. Risks, incentives and governance impact

The core of the report focuses on how vote buying affects DAO decision-making. It explores manipulation and attack vectors, considers examples of outcome-aligned or altruistic vote buying, and analyses how pricing structures influence behaviour.

3. Recommendations and design considerations

The final section presents a set of flexible recommendations for DAOs navigating vote buying. Rather than promoting a fixed approach, we offer a menu of strategies that DAOs can adopt depending on their stance whether that is to allow, regulate, or restrict vote buying.

The state of vote buying

Vote buying is not a new phenomenon in governance. Nearly a decade ago, Vitalik Buterin wrote about its role in the future of DAOs, highlighting both its disruptive potential and its ethical and economic complexity. While long discussed in theory, often as a thought experiment around how DAOs might become “markets for influence”, it remained an intellectual curiosity rather than a practical reality.

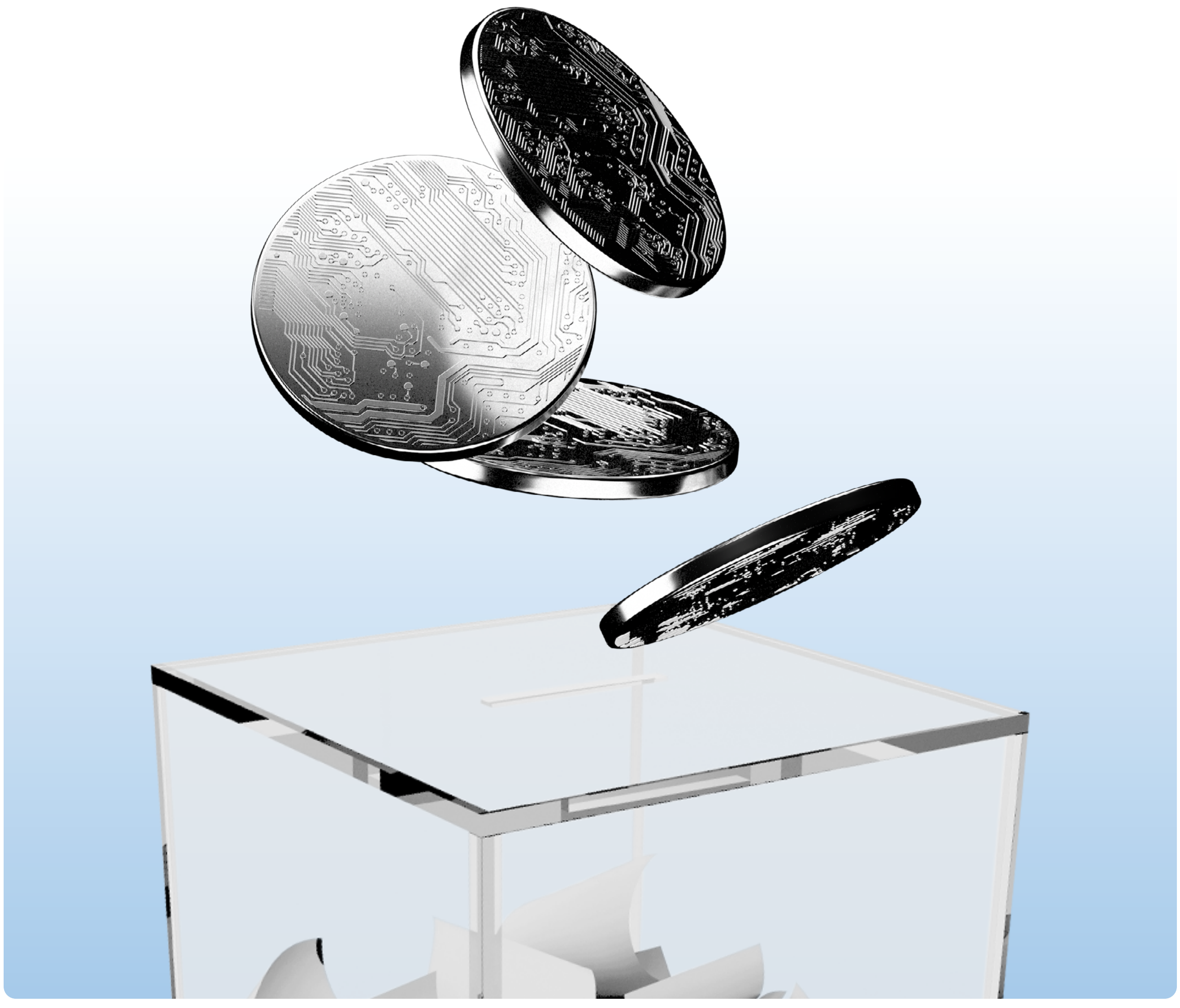
That is no longer the case. Over the past year, several protocols have launched, offering real-world implementations of vote buying in one form or another. These platforms have created active markets for governance power, allowing voting rights to be monetised. What was once a conceptual debate has now become a tangible reality and DAOs must account for these dynamics within their internal governance processes.

There are clear reasons why vote buying is gaining traction. First, it redistributes influence: power is no longer restricted to those who actively participate or hold long-standing reputations: it can be rented, bought, and sold. Second, it introduces yield opportunities for token holders in ecosystems where governance tokens typically do not generate returns. And third, it adds a new layer of dynamism to DAO operations, encouraging more frequent participation and creating new incentives around voting.

This new dynamism has sparked debate, with some viewing it as a natural evolution of onchain coordination and a tool for broader participation, while others regard it as a potential threat to the integrity and stability of DAOs.

It’s important to clarify what is meant by vote buying, as the term often evokes a narrow image of voters exchanging their votes for direct compensation. In practice, however, the concept is far broader and more nuanced. In this report, vote buying refers to a spectrum of mechanisms that leverage financial incentives to facilitate participation, influence outcomes, or redirect governance power. These mechanisms include private one-to-one deals, public bribe marketplaces, auctions, open vote-selling platforms, and even prediction markets where participants speculate on the outcomes of proposals. Though having in common the financialisation of voting, these mechanisms vary significantly in design, intention, and impact.

In the following section, we present a broader landscape of vote buying mechanisms by examining five protocols. Each takes a distinct approach to the concepts of governance and vote buying, with its own design, purpose, and implications. From LobbyFi's structured marketplace to MetaDAO's futarchy model, Butter's outcome-based funding, Hidden Hand's bribing mechanism and Event Horizon's participation-driven delegation, these protocols demonstrate that vote buying is a diverse and evolving field that reimagines how influence is exercised in DAO governance.



Mapping the landscape of vote buying platforms

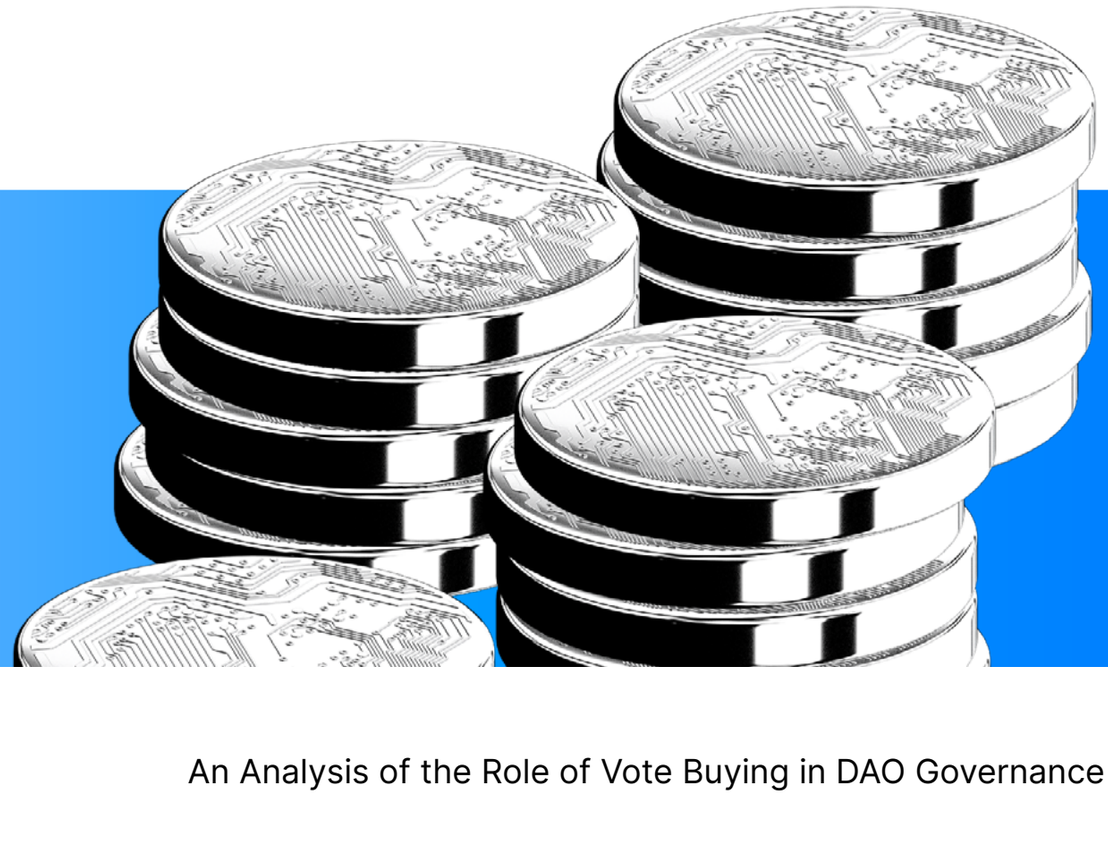
This section presents the five protocols introduced earlier that revisit DAO governance and are directly or indirectly involved in vote buying. Each takes a unique approach, contributing to the growing trend of financialising participation and influence in decentralised decision-making.

The table below offers a high-level summary of each protocol's core mechanisms, goals, limitations, and governance implications, helping to situate them within the broader vote buying landscape. This table is followed by a brief presentation of each protocol.

For readers seeking a deeper dive into the technical design, risks, and potential evolution of these platforms, a full analysis is provided in the appendix.

PROTOCOL	LobbyFi	Event Horizon	MetaDAO	Butter	Hidden Hand
CATEGORY	Vote marketplace	Incentivised delegation model / implicit delegation	Futarchy / prediction markets	Conditional funding market (futarchy)	Bribe marketplace
MECHANISM	Instant buy & auction of voting power.	- Passive holders are incentivised to delegate in the voting bloc. - NFT holders move the entire voting bloc when voting. - AI Agents assist NFT holders in their decisions.	Prediction markets decide if proposals pass based on token price forecasts.	Conditional funding via prediction markets based on KPIs & performance.	Protocols offer bribes to veToken holders to influence gauge votes.
KEY USE CASE	- Passive token holders can monetise their voting power. - Buyers gain influence instantly.	- Passive token holders can monetise their voting power. - Governance participants with limited voting power can enhance their influence through active engagement.	DAOs make decisions based on price prediction from proposals.	Grants awarded based on predicted ROI rather than sentiment or popularity.	Protocols maximise emissions by rewarding votes. *Note: Model specific to incentive pools (Curve, Convex, etc.)*

PROTOCOL	LobbyFi	Event Horizon	MetaDAO	Butter	Hidden Hand
GROWTH STAGE	Live on multiple chains with 19M ARB delegated	In the early stage with 200 governance NFTs.	Live with permissionless deployment underway.	In its early stage, with an initial experimental proposal for Optimism.	Live with $35M in bribe volume processed.
OPPORTUNI-TIES	- Monetises idle governance tokens. - Increases delegation.	- Empowers small voters and expertise. - Aligns influence power with contribution.	- Voters are held accountable for the outcomes of their decisions. - Encourages informed and data-driven speculation. - Rewards accurate analysis and predictive insight.	- Aligns treasury funding with clearly defined, measurable outcomes. - Incentivises informed and strategic allocation decisions. - Requires projects to present a roadmap and demonstrate responsible grant usage.	- Streamlined UI for incentives. - Boosts voter participation.
LIMITATIONS	- Centralised control over proposal listing and pricing; - Outcomes on controversial proposals can be influenced by vote buying.	- Requires DAO funding to sustain yield. - Centralised structure managed by a team of 4 people. - Using AI models introduces assumptions about trust and accuracy.	- Primarily accessible to traders with available capital. - Limited inclusivity for non-capitalised participants. - Susceptible to price manipulation in low-liquidity environments.	- Limited liquidity can hinder accurate market outcomes. - Delayed reward resolution may deter short-term participants. - Exposed to bribery risks from project teams influencing votes.	- Favours wealthier protocols. - Transforms votes into profit-maximisation tools.

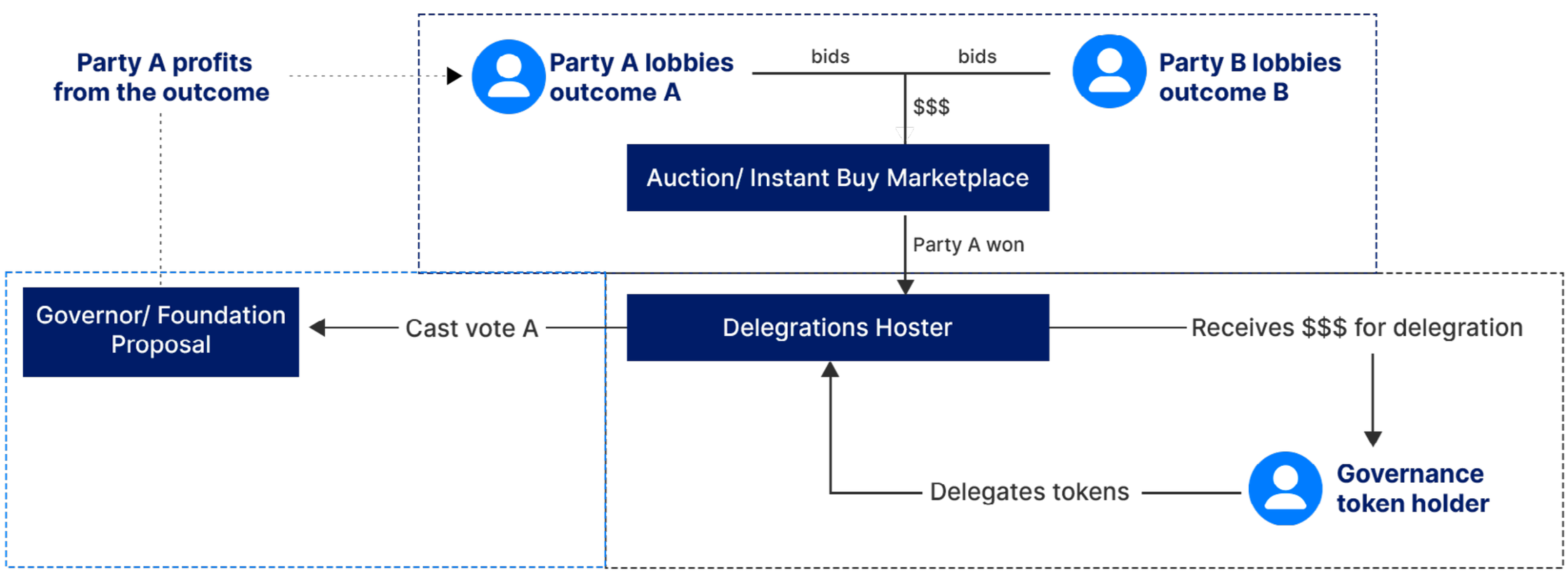


LobbyFi

LobbyFi is a governance protocol that introduces a market-based model for DAO participation, turning voting power into a tradable, yield-generating asset. It enables token holders to delegate their voting rights to third parties through a marketplace, where voting power is acquired on a per-proposal basis via fixed-price purchases or auctions. This framework shifts governance from a purely civic activity toward one shaped by market incentives. The protocol is deployed across multiple chains, including Arbitrum, Optimism, Scroll, and zkSync, and has seen notable activity in the Arbitrum DAO, particularly following a delegation of 18.9 million ARB.

LobbyFi addresses several recurring challenges in DAO governance. First, it provides a mechanism for token holders to earn yield on otherwise idle governance tokens by delegating their votes. Second, it introduces an economic layer to governance participation, which may encourage engagement from previously passive holders. Third, it alters the distribution of influence by linking voting power to demand in a transparent market. Lastly, it brings transparency and structure to practices that often occur informally, such as private vote deals, selling, or bribing.

The protocol operates through two primary mechanisms: Instant Buy and Auctions. Token holders can delegate their votes to LobbyFi, with the ability to revoke delegation at any time. Delegated votes are aggregated and listed for sale. Instant Buy allows a purchaser to acquire the full voting bloc at a fixed price in ETH. Alternatively, auctions enable competing bids across voting options (e.g., “For” vs. “Against”), with the winning side determined by the highest aggregate bid, provided a minimum reserve threshold is met. If that threshold is not met, the protocol votes “abstain,” which still counts toward the quorum.

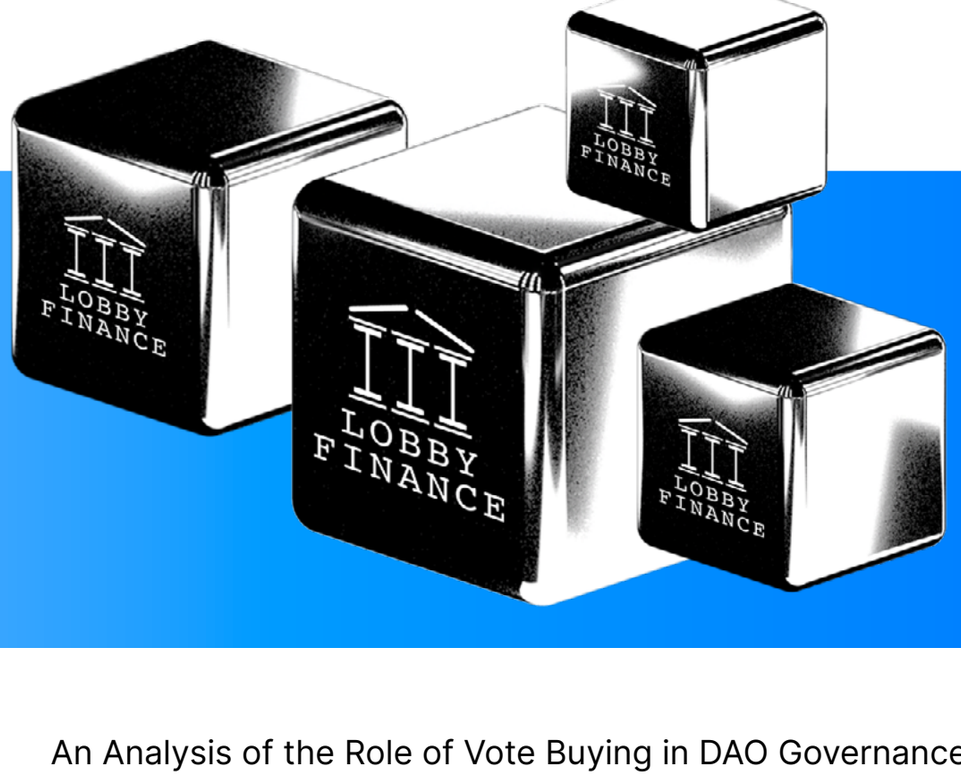


Proposal listings, voting mechanics, and price settings are currently determined by the LobbyFi team. Proposals flagged as potentially harmful or extractive can be excluded from monetisation, with a default “Against” vote applied. This centralised discretion is framed as a safeguard to protect integrated DAOs. The “Pills” program, which rewards participation with points, may indicate plans for future decentralisation, though specifics are yet to be defined.

LobbyFi’s approach has generated active discussion, particularly regarding its influence within the Arbitrum DAO. Critics have raised concerns that monetising votes could distort governance by allowing capital to override alignment, domain expertise, or broader community values. There is also a risk that the relatively low cost of acquiring voting blocs (based on the team’s assessment of proposal risk, financial impact, and other contextual factors) could create openings for governance manipulation, especially in cases of low participation or contested proposals.

The LobbyFi team has acknowledged these concerns and states that its primary goal is to increase participation while minimising manipulation. They engage with DAOs to clarify listing decisions and avoid monetising votes on proposals perceived as extractive. In a recent interview, the team explained their pricing approach: for proposals with identifiable beneficiaries, prices are generally set at 1% of the proposal’s expected financial gain. For others, they benchmark against the cost of acquiring voting power through alternative methods such as borrowing governance tokens, offering a lower-cost option in the 1 to 2% range. However, the team notes that this approach may evolve as the governance market matures.

LobbyFi reflects a broader shift in DAO governance toward incentive-driven, market-based models. While its structure introduces new coordination mechanisms, it also presents risks related to influence concentration and vote commodification. Ongoing evaluation will be needed to assess its long-term impact on DAO governance design, participation quality, and institutional integrity.

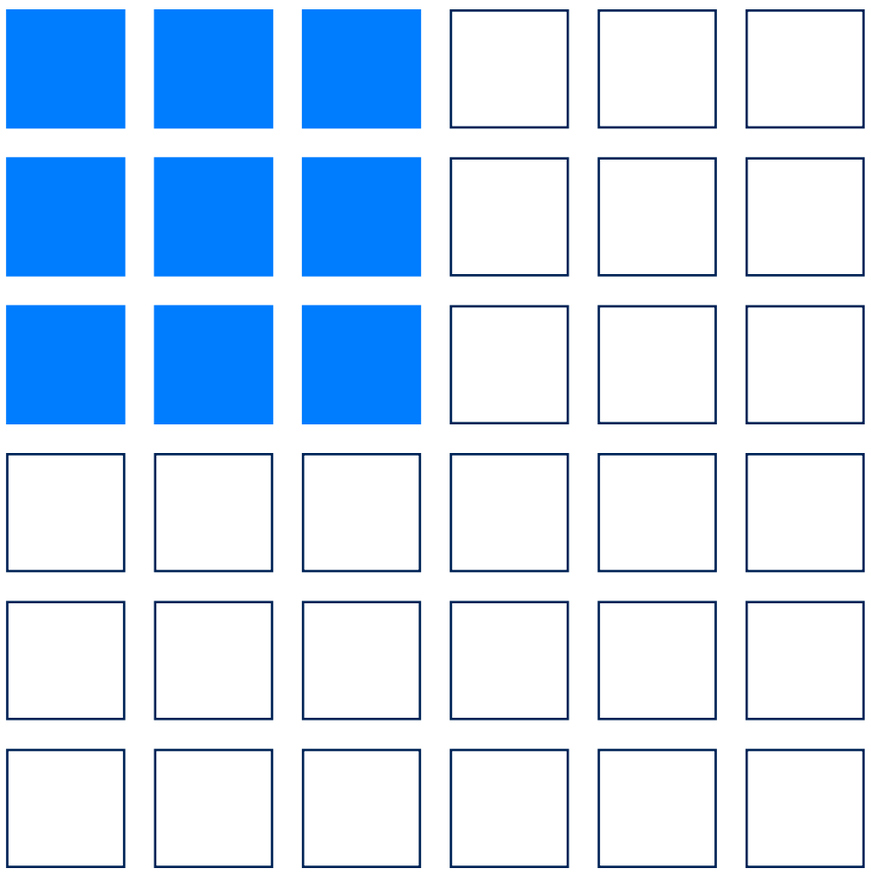


Event Horizon

Event Horizon is a governance platform that explores alternative models for how influence is earned and exercised within DAOs. Rather than reinforcing capital-weighted voting systems, it introduces mechanisms intended to prioritise participation, domain expertise, and engagement. Its core design offers three elements: yield generation for passive token holders, expanded governance influence for smaller holders through increased voting weight, and the ability for protocol users to participate in governance across a broader range of DAOs.

The platform targets several persistent challenges in DAO governance, including low voter participation, high concentration of power, and the limited influence of domain-specific experts, particularly those without large token holdings. Over time, Event Horizon aims to function as a secondary governance layer, providing an environment where new participants can engage with meaningful influence across multiple DAOs.

At the centre of the system is Implicit Delegation, a model in which token holders delegate their voting power in exchange for yield, while a fixed set of governance NFTs determine how the voting bloc is used. Each NFT represents one vote, decoupling governance from token wealth. When a proposal is active, a majority decision among the NFT holders determines how the full delegated vote is cast. This structure shifts influence toward engaged participants and away from capital accumulation.



The Fraction of voter pass holders who decided to participate will move the entirety of the treasury voter block.

The fewer people that participate, the more authority each person who **does** will effectively control.

A second mechanism, Sacrificial Specialisation, is under development. It will allow NFT holders to increase their influence in specific governance domains, such as DeFi, gaming, or protocol security. However, unlike traditional technocratic models that concentrate expertise and capital, this approach introduces trade-offs: deeper specialisation in one domain comes at the cost of general authority elsewhere. The aim is to enable domain experts to lead within their areas of knowledge, while still allowing generalist perspectives to be represented at a more limited level. However, it is important to note that the status of “expert” in this system is determined by participation within the platform, rather than by external credentials or demonstrable domain expertise.

Each governance NFT also functions as an AI agent, assisting its holder by explaining proposals, aligning votes with user preferences, or voting autonomously based on predefined parameters. These agents are designed to reduce common barriers to voter participation, particularly time constraints and lack of subject-matter knowledge. For users willing to engage, they offer a structured way to participate without requiring constant oversight.

At present, Event Horizon offers approximately 15% yield for delegated tokens, funded through Optimism incentives. While the original plan involved deploying DeFi yield strategies, this was reconsidered due to the complexity and relatively low yields associated with DAO tokens. The current model instead depends on DAOs providing incentives to attract users and surface expertise, an approach that reflects the cost of broadening participation beyond traditional capital holders.

Event Horizon remains in an early developmental stage and faces design and operational complexities. Its model depends on sustained financial support from DAOs to fund voter incentives. Governance remains centralised in a small, four-person team, with no formal community control in place. As voting power consolidates around NFT holders, concerns arise around sybils (safeguards are implemented according to the team), the centralisation of influence, and whether AI agents will accurately represent voter intent.

The platform sits at the intersection of governance-as-a-service and delegation infrastructure, with a focus on reactivating unused voting power and expanding influence for informed, non-wealthy participants. While the system technically allows for the sale of its voting bloc, enabling forms of vote buying, this is not a core feature of the protocol. Its broader objective remains the development of a more inclusive and structured governance model for DAOs.

MetaDAO

MetaDAO is the first project to bring futarchy fully onchain, turning governance decisions into market-based forecasts. Rather than asking the typical DAO question “Should we do this?”, MetaDAO reframes the conversation as “Will this improve the value of our token?”. In doing so, it transforms DAO governance into a system guided by prediction markets, where policy is determined not by sentiment or ideological alignment, but by economic speculation on outcomes.

When a proposal is raised, MetaDAO creates parallel prediction markets: one assumes the proposal will be implemented, and one assumes it will not. Traders then speculate on which version of the future will result in a higher token price. If the “approve” market implies a higher valuation than the “reject” market, the proposal passes. This mechanism introduces a layer of market-based rationality to governance, rewarding participants for accurately predicting which path will create more value. Unlike traditional governance systems where voter preferences are hard to benchmark, MetaDAO uses token price as the core metric of legitimacy.

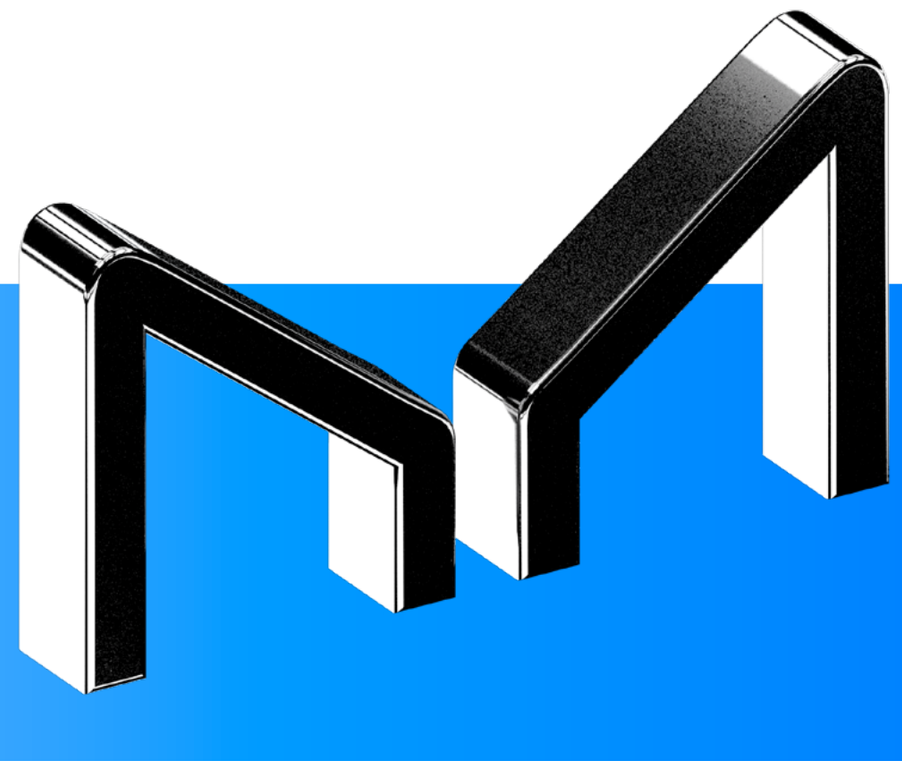
MetaDAO offers both binary and scalar markets. In binary markets, participants bet on whether a proposal’s outcome will occur, earning a fixed payout if correct. Scalar markets, on the other hand, allow speculation on the magnitude of impact, capturing more granular expectations. Once trading closes, the system compares the final prices: if the market predicts the proposal will improve value, it’s executed. Traders in the losing market are refunded, while those in the winning market see their trades settled and may receive additional rewards if incentives are distributed (An example with Jito in this tutorial.)

Still, MetaDAO’s model introduces trade-offs. By design, it demands financial participation from voters, favouring those with trading knowledge, capital, and a high tolerance for volatility. In its current form, the model tends to prioritise short-term signals over long-term value creation. Community members who are philosophically aligned with a DAO’s mission but lack the resources, trading skills and risk-appetite to participate in markets may find themselves sidelined.

In low-liquidity environments, MetaDAO’s markets are also vulnerable to manipulation. A single large participant can easily skew prices to sway proposal outcomes. Past proposals have shown irregular price spikes, suggesting that while the markets are functional, they are not always efficient or immune to gaming.

Finally, MetaDAO settles markets immediately after votes conclude, rather than waiting to observe the actual outcomes of policies. As such, the real-world impact of a decision becomes secondary to the speculative dynamics of the market.

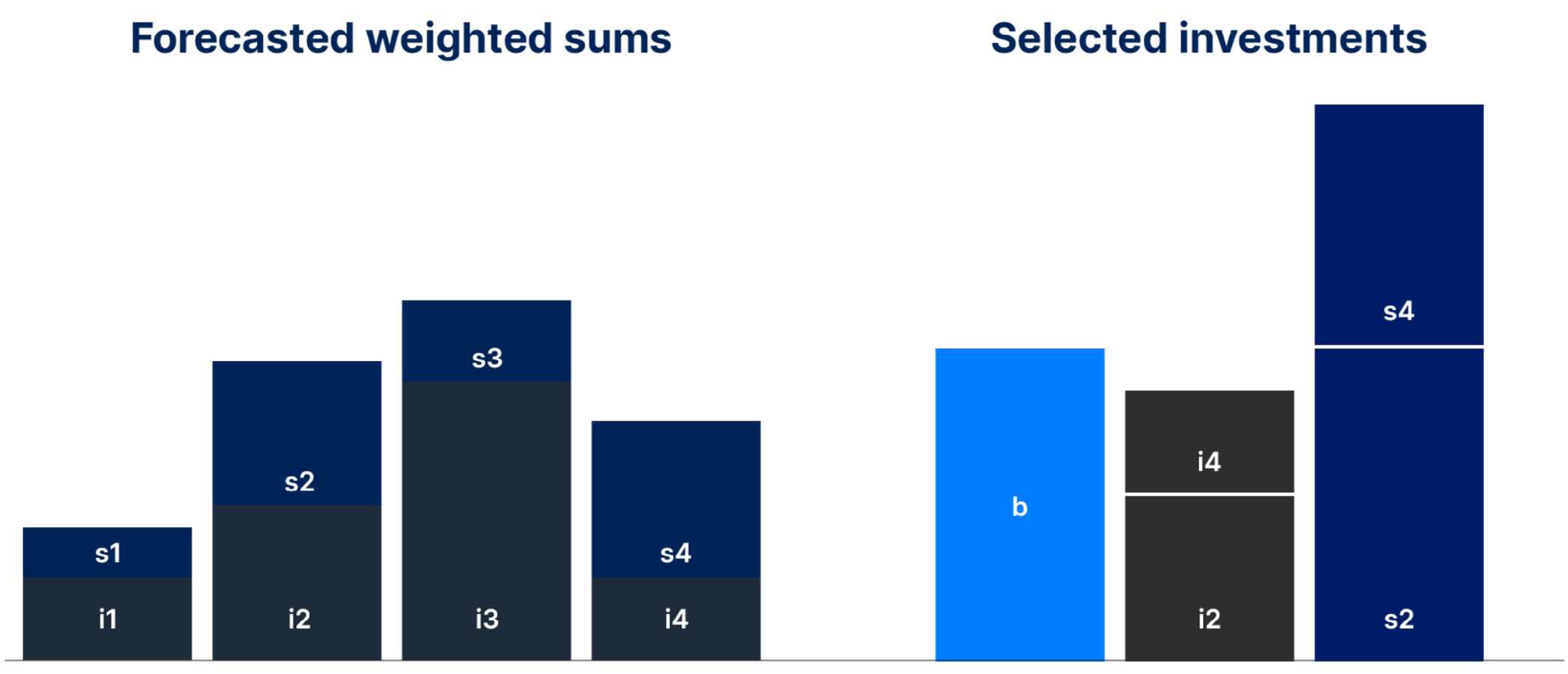
Despite these limitations, MetaDAO represents a bold rethinking of governance: one that seeks to replace politics with predictive consensus. Its experiment with onchain futarchy may not be perfect, but it opens new ground for DAOs seeking for new models to boost participation and increase predictability.



Butter

Butter introduces a specialised form of futarchy to tackle a persistent challenge in DAO ecosystems: how to allocate treasury funds in a way that is both efficient and accountable.

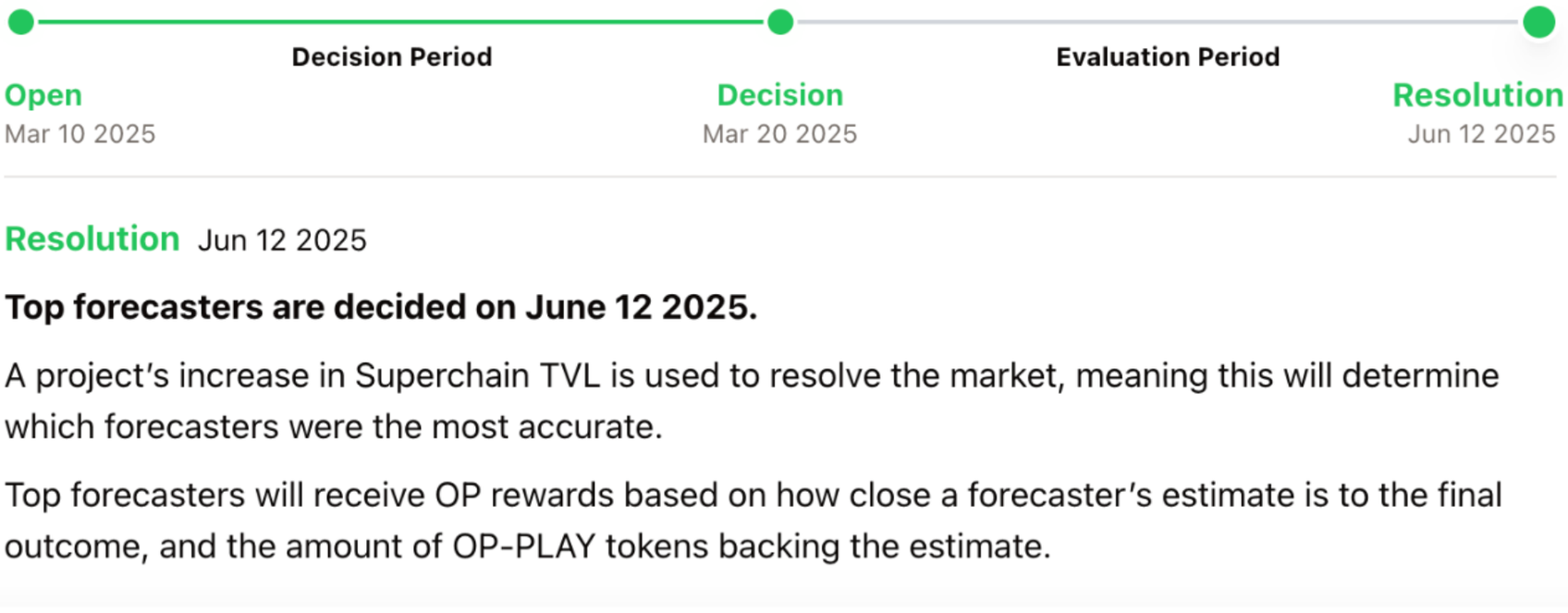
Instead of applying prediction markets across all governance decisions, Butter narrows its focus to funding proposals, using Conditional Funding Markets (CFMs). In this model, project proposals are evaluated not by sentiment or reputation but by their expected performance against clearly defined metrics. The result is a governance structure that aims to maximise return on treasury capital while reinforcing transparency and strategic alignment.



At the heart of Butter's design is a multi-step process. First, the DAO defines a composite metric or KPI (such as growth in transaction volume, active users, or retention rates) that captures what it aims to optimise. Each project applying for funding must propose a roadmap with specific milestones to reach the metric. Once submitted, two prediction markets are launched for each proposal: one assuming the project is funded, the other assuming it is not. Participants, using collateral like sDAI (which continues to earn yield during the voting period), can trade on the outcomes they believe are most likely. These markets remain open for a fixed period, after which a decision rule is applied to determine the winners, for example, selecting the top three protocols by total votes, provided each has received support from a minimum number of unique wallets.

Funding is then allocated accordingly, with the final resolution (payout to voters) occurring only after the outcomes have been delivered and measured.

The strength of this system lies in its alignment of incentives. Projects are motivated to offer realistic, measurable goals; voters (or rather, traders) are incentivised to back only the proposals they genuinely believe will succeed; the DAO benefits from a decision-making process based on rational votes and tangible outcomes. Unlike classical futarchy, which often requires broad ideological consensus on a utility function, Butter simplifies the model by narrowing it to specific funding decisions, making it both more practical and more measurable. Its approach also differs significantly from that of MetaDAO by delaying market resolution until project impact is observable, rather than settling immediately after the vote. This creates a longer feedback loop that rewards accuracy over speculation.



However, Butter's model is not without its challenges. Liquidity is essential for prediction markets to function effectively and as long as it remains niche, price manipulation is possible. Additionally, the model shifts decision-making power from DAO token holders to traders who are willing and able to take risk, potentially creating a divide between long-term stakeholders and short-term speculators. There's also the possibility for bribery: projects may attempt to influence traders off-chain or through informal incentives in order to skew predictions in their favour.

Despite these risks, Butter represents one of the most promising real-world applications of futarchy in DAO governance. It reframes treasury allocation as a market-driven discovery process, rewarding accuracy, data-informed judgment, and measurable impact. In doing so, it pushes governance from vague political processes toward performance-oriented decision-making.

Hidden Hand

Hidden Hand, developed by Dinero, is a bribe marketplace. It enables protocols to offer financial rewards, commonly referred to as “bribes”, to influence gauge votes, particularly around the allocation of token emissions. While it does not yet extend to general governance proposals, its current model has processed over $35 million in bribe volume and onboarded 19 partner protocols, including major players like Balancer, Aura, and Redacted.

The platform is designed to solve a very specific problem in DAO governance: the inefficiencies and low participation rates that stem from poor user experience, unclear incentives, and complex voting mechanics. Hidden Hand offers a streamlined interface where users can browse active bribe markets, compare potential rewards across pools, and vote directly from the platform. For those seeking simplicity, the protocol also allows users to delegate their governance rights, either via veTokens or veNFTs, to Hidden Hand itself, which will vote on their behalf in a way that maximises returns. A 4% fee is charged on all claimed rewards, which is then distributed to sDINERO holders and the Dinero treasury.

From the user’s perspective, the process is optimised for clarity and yield, turning governance participation into a financial strategy rather than a purely ideological act. Protocols, on the other hand, use Hidden Hand to efficiently allocate bribes with two primary mechanisms: range bribes, which pay a fixed amount per vote, and limit bribes (also called fill-or-kill), which set a maximum payout threshold. These mechanisms allow projects to budget their influence campaigns with precision, while simultaneously tracking their effectiveness in real time.

Yet this financialisation of governance introduces important questions. Hidden Hand’s efficiency inherently favours projects with deeper treasuries. Smaller or emerging protocols often struggle to compete with well-funded incumbents, and influence becomes increasingly tied to financial capacity. While bribes are transparent and users technically retain their voting agency, the dynamics at play encourage transactional behaviour, voting not on preference or conviction, but based on where the highest return lies. As such, the line between incentivised participation and outright vote buying becomes increasingly blurred.

Currently, Hidden Hand restricts its scope to emissions-related votes, but the infrastructure could be extended to general DAO proposals with minimal development. In that scenario, Hidden Hand would shift from being a yield optimiser for gauge votes to a protocol influencing all types of governance proposals.

Risks, incentives and governance impact

In this section of the report, we explore how vote buying can shape governance outcomes across DAOs. We analyse key manipulation and attack vectors, highlight examples of outcome-aligned or altruistic vote buying, and examine vote buying pricing mechanisms.

While the analysis is broadly applicable to DAO governance, we use the Arbitrum DAO as a case study in some sections to illustrate specific risks and feasibility assessments.

Attack & manipulation vectors

We examine three categories of vote buying-related manipulation and attack vectors, focusing on their execution and feasibility. To ground this analysis in real-world conditions, we use the Arbitrum DAO as a case study to showcase how these risks can manifest within an active governance system.

The attack vectors we analyse include:

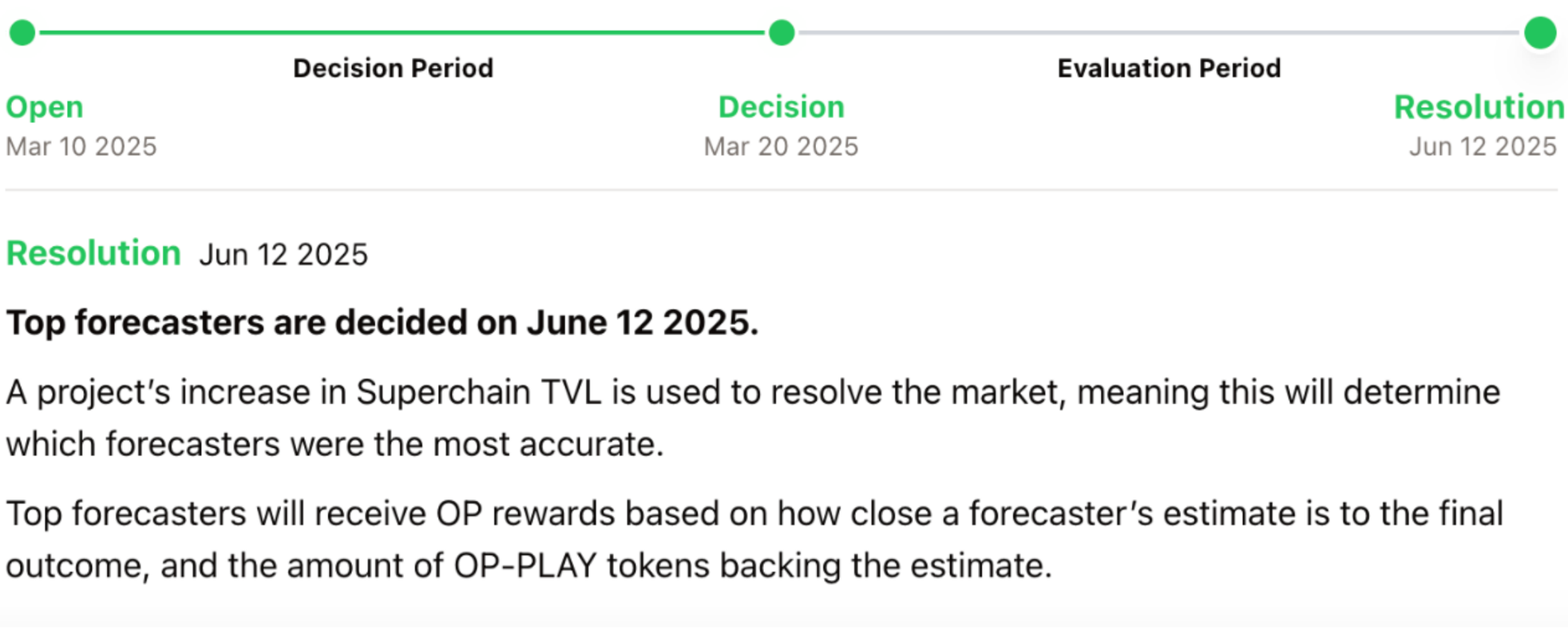
- **Direct bribe strategies**: Buying votes from apathetic voters or using vote buying platforms such as LobbyFi.
- **Whale collusion:** Risks arising from coordinated voting among large token holders or concentrated voter groups.
- **Dark DAOs:** Risks associated with hidden or off-chain accumulations of voting power.

1. Direct bribe strategies

Direct bribe strategies in DAO governance involve exchanging voting power for monetary incentives. In the Arbitrum DAO, this occurs openly through platforms like LobbyFi. In more speculative cases, it could also take the form of private financial offers made directly to delegates or token holders. While LobbyFi enables transparent vote buying, there is currently no confirmed evidence of off-platform bribes within the DAO.

Platform gatekeeping and access constraints

An important factor influencing the feasibility of direct bribe strategies is the accessibility and gatekeeping role of vote buying platforms. In the case of Arbitrum, LobbyFi serves as a discretionary filter, determining which proposals are eligible for vote buying. According to the platform's stated policy, only proposals deemed "secure" or legitimate, based on internal assessments, are approved for listing.



Given these practices, it is unlikely under current conditions that LobbyFi would permit vote buying on proposals considered highly contentious, strategically sensitive, or potentially harmful to the DAO. This internal curation process creates a significant constraint on the use of vote buying for governance manipulation.

As a result, any attempt to influence governance through LobbyFi would be restricted to proposals that have been explicitly approved by the platform. Malicious or high-risk proposals would likely remain ineligible, requiring attackers to pursue alternative methods of acquiring voting power, such as off-platform accumulation or collusion with large private holders.

Thus, the feasibility of direct bribe strategies depends not only on the amount of voting power available for purchase, but also on platform-level constraints that determine whether that power can be mobilised for a particular proposal. This informal but impactful gatekeeping introduces a layer of risk filtering, which currently reduces the likelihood that vote buying could be easily weaponised in critical governance contexts.

Scale and feasibility of vote buying

Voting data from recent high-impact, non-constitutional proposals in the Arbitrum DAO illustrates the scale typically required for successful governance outcomes. For example, the Arbitrum Audit Program received 197.5 million votes, while the Stable Treasury Endowment Program 2.0 saw 194.4 million, both nearing the 200 million ARB mark in total voting power.

In contrast, the current amount of ARB delegated to vote buying platforms remains relatively small. LobbyFi holds approximately 19.3 million ARB, while Event Horizon holds around 7 million ARB. This represents a substantial gap in voting power. Under present conditions, vote buying alone is unlikely to determine the outcome of major proposals.

As a result, any governance attack that relies solely on vote buying would be limited in its effectiveness. To accumulate sufficient influence, such an attempt would likely need to be combined with additional capital mobilisation strategies, such as:

- Acquiring ARB directly through market purchases or over-the-counter deals
- Borrowing tokens through lending protocols or centralised exchanges
- Coordinating with private holders or aligned voting blocs through off-chain agreements

Based on prior research conducted by Nethermind in collaboration with Castle Labs on governance risks, it was identified that approximately 50 million ARB is currently available in lending markets, distributed across both DeFi platforms (such as Aave and Silo) and CeFi platforms (such as Binance).

For non-constitutional proposals, the current quorum is approximately 130 million votes. Assuming no other delegates vote in the same direction, an attacker would need at least that amount of voting power for a proposal to pass.

However, if the proposal is clearly malicious, for example transferring a large quantity of ARB from the Arbitrum treasury to a single address, it is likely that the broader delegate community would mobilise to vote against it.

Based on governance risk research conducted by Nethermind and Castle Capital, and accounting for historical participation rates within the Arbitrum ecosystem, it is estimated that an attacker would need control of approximately 200 million ARB to reliably overcome opposition and execute a governance attack with a high probability of success.

For these reasons, we do not currently consider the risk of vote buying to be particularly high, even when combined with leveraged strategies such as borrowing through lending markets. However, with an estimated 75 million ARB accessible through both vote buying platforms and lending protocols, it remains important to monitor this number closely.

Tracking the availability of ARB through lending markets and vote buying mechanisms will help ensure the DAO stays informed and positioned to respond proactively to emerging governance threats.

> ***Feasibility conclusion***

Moderate. Feasibility Conclusion Moderate. Direct bribe strategies are technically straightforward but constrained by access limitations and insufficient voting power. While platforms like LobbyFi currently limit the scope of vote buying in DAOs such as Arbitrum, these constraints could erode over time. In smaller governance contexts, vote buying already has the capacity to meaningfully affect outcomes.

Across DAOs more broadly, the key to assessing the feasibility of direct bribe strategies lies in evaluating the combined supply of tokens available for vote buying, the amount of tokens accessible via lending markets, the size of the quorum threshold, and the proportion of active voting supply. A DAO with a high quorum, low active participation, and substantial token liquidity in lending and vote buying platforms may be especially vulnerable to coordinated manipulation.

Monitoring these metrics collectively is essential for understanding the evolving threat landscape and designing appropriate safeguards. While platforms like LobbyFi currently limit the scope of vote buying in DAOs such as Arbitrum, these constraints could erode over time. In smaller governance contexts, vote buying already has the capacity to meaningfully affect outcomes.

2. Whale collusion

Large holders of ARB who vote in alignment, whether through self-delegation or informal coordination, can exert significant influence over governance outcomes. These actors include major delegates, DAO treasuries, and institutions that receive substantial delegated voting power or hold large ARB balances. Even if individual actors operate independently, the concentration of voting power among a small number of participants raises the risk of coordinated behaviour that could affect the neutrality or competitiveness of decisions.

To assess these risks, this analysis uses delegated supply, which refers to the portion of ARB that has been explicitly delegated, either through self-delegation or to another address. This approach

differs from Arbitrum's formal definition of votable supply, which includes all circulating ARB expect tokens delegated to the Exclude Address. While votable supply is relevant for determining quorum thresholds, it includes large amounts of undelegated tokens that are unlikely to participate in actual voting.

In contrast, delegated supply offers a more accurate snapshot of the voting power that is currently mobilised and capable of influencing outcomes. At present, delegated supply stands at approximately 364 million ARB. This narrower focus excludes idle or inactive tokens, providing a clearer picture of how voting power is distributed among engaged participants. By using delegated supply as the basis for analysis, we can more effectively evaluate centralisation risks, map the formation of voting blocs, and assess the potential for coordinated behaviour among powerful actors.

Quorum thresholds and delegate distribution

Based on the most recent delegation data, the top 16 delegates collectively control approximately 190 million ARB. While this figure falls short of the 200 million ARB mark, it is within reach if an additional 10 million ARB were to be borrowed. For the purposes of this analysis, we assume such an acquisition is feasible through conservative strategies, bringing the total voting power of this coordinated group to 200 million ARB.

A voting bloc of this size would represent roughly 55% of the delegated supply, which stands at 364 million ARB. Although the quorum requirement for non-constitutional proposals remains at 130 million ARB, securing 200 million votes would provide near-certain passage of any proposal, rendering opposition largely symbolic.

Despite the concentration implied by this scenario, the immediate risk of coordinated collusion remains limited. The top 16 delegates span a range of profiles, including independent contributors, decentralised collectives, and institutional actors, each operating under distinct mandates and accountability structures. Achieving alignment across such a diverse group would require substantial off-chain coordination and incentive compatibility, which are difficult to engineer in practice.

Nonetheless, the ability of a relatively small group to approach majority control highlights the importance of continued delegation from the broader token holder base. Encouraging more holders to delegate to smaller, active participants could support a healthier distribution of influence and reinforce the DAO's long-term decentralisation.

Feasibility conclusion

Low. While governance capture through whale collusion is structurally possible, practical coordination remains unlikely in the case of Arbitrum. The top 21 delegates collectively hold enough voting power to meet quorum, but they represent a diverse set of stakeholders with different objectives, reputational incentives, and varying degrees of independence. Many of the largest delegates are publicly known or associated with registered entities, making coordinated malicious behaviour both risky and unlikely. Orchestrating such actions would require a high degree of off-chain trust and alignment, none of which has been observed to date.

That said, the structural concentration of voting power remains a valid concern and cannot be fully dismissed. Even if the current risk is low in Arbitrum, the situation may differ in other DAOs with less diverse delegate compositions or lower transparency standards. In those cases, the likelihood of effective collusion or capture could be materially higher.

To mitigate long-term risks, DAOs should strive to further decentralise governance by activating more token holders and supporting the growth of smaller, independent delegates.

3. Dark DAOs and off-chain coordination

Dark DAOs refer to opaque off-chain coordination structures that pool voting power while remaining hidden from public view. Unlike traditional DAOs or vote buying platforms such as LobbyFi, Dark DAOs do not operate transparently. Their members, intentions, and internal processes are not visible onchain. Instead, coordination may occur through private messaging channels, spreadsheets, multisigs, or trusted execution environments that enable actors to organise without revealing their participation.

Although the concept of Dark DAOs has been discussed since 2018, their technical feasibility has recently been demonstrated in practice. In DAO Decentralization: Voting-Bloc Entropy, Bribery, and Dark DAOs, researchers from Cornell Tech and IC3 present functioning Dark DAO prototypes built on Oasis Sapphire using trusted execution environments. These prototypes show how off-chain coordination could facilitate anonymous governance influence, coordinated vote buying, or resistance to identity-based participation constraints. The research highlights that such actors are not only plausible but can be practically implemented using existing tooling.

Current visibility within Arbitrum DAO

At present, there is no concrete evidence of a Dark DAO operating within the Arbitrum ecosystem. Unlike platforms such as LobbyFi, which are public, branded, and trackable, Dark DAOs remain a theoretical concern. There have been no identifiable token accumulation patterns, synchronised voting behaviours, or off-chain signals that would suggest a Dark DAO has formed or intervened in governance processes.

Nonetheless, their emergence remains a realistic future scenario. As privacy-preserving infrastructure, decentralised identity, and coordination tools continue to mature, the conditions enabling such entities to operate discreetly are steadily improving. If they were to emerge, Dark DAOs could influence proposal outcomes without public accountability, posing risks to transparency and decentralised decision-making. While no immediate action is required, continued monitoring and ecosystem awareness may help surface early indicators as such actors begin to take shape.

Feasibility conclusion

Low. Although technically feasible, there is currently no sign of active Dark DAOs within Arbitrum. Their operations, by design, are difficult to detect, and their potential to influence governance without visibility represents a meaningful long-term concern. Unlike public platforms such as LobbyFi, there are no observed token accumulation patterns, coordinated voting behaviours, or other signals

suggesting that Dark DAOs are currently shaping governance decisions.

That said, DAOs more broadly should not assume the same low risk. In ecosystems with less transparency, lower delegate accountability, or high coordination incentives, the emergence of Dark DAOs may be more likely. As privacy-preserving infrastructure and coordination tooling mature, the feasibility of such entities increases.

Monitoring the emergence of Dark DAOs will be critical, as this remains a nascent but rapidly evolving threat category. Because their nature resists detection, proactive data analysis, behavioural monitoring, and improvements in off-chain signal tracing will become essential tools.

Can vote buying be altruistic?

While the previous section focused on the risks of manipulation through vote buying, it's important to recognise that financial incentives can also serve the DAO's best interests. The following two case studies on Rari Capital and Aave illustrate how vote buying, or the strategic use of incentives, can help uphold ethical commitments or support expert-driven risk mitigation in decentralised governance.

1. Rari Capital - coordinated incentives for ethical governance

In late 2021, Fei Protocol and Rari Capital merged to form Tribe DAO, aiming to combine two complementary products: Rari's lending infrastructure and Fei's liquidity-backed stablecoin.
Rari Capital was a DeFi protocol best known for Fuse, a permissionless lending and borrowing platform that allowed users to create customised lending pools. It gained early traction due to its composability and innovation in uncollateralised lending markets. Fei Protocol, on the other hand, introduced a novel stablecoin mechanism that used protocol-controlled value to maintain the peg of its stablecoin, FEI, to the US dollar.

In April 2022, the newly formed Tribe DAO was shaken by an $80 million exploit targeting Rari's Fuse pools. An attacker exploited a vulnerability within one of the pools to extract funds. While the hack did not directly affect the stability of the FEI stablecoin, it severely undermined trust in the Fuse platform, with significant consequences for other protocols such as Olympus DAO and Frax Finance, which had deposited substantial assets into the affected pools.

Following the attack, Tribe DAO held an initial governance vote in which the community supported fully compensating all affected users, including both individuals and DAOs. The funds were to come from the DAO's protocol-controlled value, a course of action widely seen as the most ethical and

reputationally sound. However, the core team subsequently introduced a new onchain vote to reverse this decision, citing concerns over potential legal liabilities and governance precedent. This second vote passed by a narrow margin, cancelling the planned reimbursement. The reversal triggered a governance crisis, leading to accusations of centralised decision-making and failure in the DAO's "social contract".

In response to this reversal, both Olympus DAO and Frax Finance launched a coordinated bribing campaign. Having collectively lost approximately $21 million in the exploit, they believed Tribe DAO had a moral obligation to honour its original commitment. They publicly offered bribes to TRIBE token holders to delegate their votes in favour of full reimbursement. Olympus and Frax pledged millions of dollars in incentives, amounting to roughly $0.10 per TRIBE token (over $9 million in total). While they had a financial stake in the outcome, their main argument was that if DAOs fail to honour social obligations, it would question the legitimacy of DAO governance and the credibility of DeFi as a whole.

Ultimately, the bribing campaign succeeded. In September 2022, Tribe DAO passed a final proposal to fully reimburse victims. Shortly after, the DAO initiated steps to wind down operations and return remaining assets to TRIBE holders.

Although Olympus DAO and Frax Finance had direct financial interests in securing reimbursement, their efforts came at significant cost in terms of time, capital, and coordination. Some may argue that the financial incentives offered were still below the amount exploited, making the move primarily self-beneficial. Others may view it as a broader community-driven initiative. In any case, this action highlights how this form of bribing or vote buying can influence the final outcome of an event or decision.

2. Aave - risk warnings overlooked until crisis

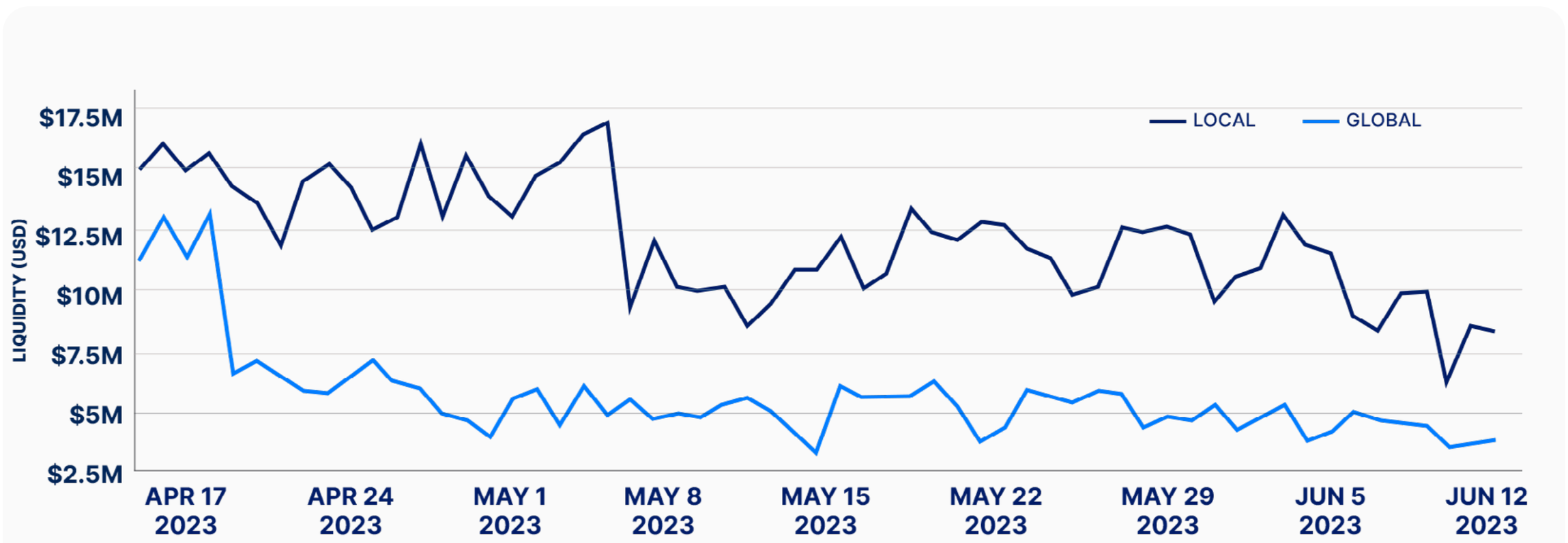
Gauntlet was in charge of risk assessment and parameter adjustments for Aave, aiming to manage systemic risk and maintain solvency. Its recommendations were sometimes met with resistance from token holders focused on short-term outcomes or not fully aware of the underlying risks.

One of the most revealing episodes of Gauntlet's differing view on risk management occurred in mid-2023, centred on the risks posed by CRV and the highly leveraged position held by Curve Finance founder Michael Egorov. Egorov had used hundreds of millions of CRV tokens as collateral across several lending protocols, including Aave, where he borrowed millions in USDT on Aave v2, backed by over 288 million CRV tokens. This position was both highly concentrated and largely illiquid, leaving

the protocol exposed to significant bad debt risk. CRV liquidity had been steadily deteriorating, with Gauntlet noting a roughly 50% decline in depth across centralised and decentralised exchanges. If CRV's price dropped sharply, Egorov's position could become undercollateralised, and due to CRV's low liquidity, Aave might not be able to liquidate the position effectively, resulting in unrecoverable losses for the protocol.

In June 2023, Gauntlet issued a clear recommendation: freeze CRV as collateral and set its Loan-to-Value ratio to zero on Aave v2. This would prevent Egorov from further borrowing against CRV and begin reducing Aave's exposure to this risk. While technically straightforward, the proposal was politically sensitive. The community rejected it, wary of interfering with the position of a prominent DeFi founder and unwilling to disrupt a reliable source of borrowing activity.

GRAPH **LOCAL vs. GLOBAL LIQUIDITY - USD (from start date to end date)**



By late July, Curve Finance was hit by a series of high-profile hacks caused by a vulnerability in the Vyper compiler, resulting in over $60 million being drained from several stablecoin pools. Market confidence in CRV collapsed, leading to a sharp price decline. Egorov's collateral was heavily impacted and came close to triggering a liquidation cascade. Aave was within days of potentially realising tens of millions in bad debt. In an effort to avoid this, Egorov began selling CRV OTC at steep discounts to various counterparties in order to repay his debt and prevent systemic fallout.

Gauntlet resubmitted their proposal in August 2023. This time, it passed and Aave governance approved the recommendation to freeze CRV as collateral. This derisked the AAVE protocol massively, however it arrived only after the threat had become painfully real.

A few months after, Gauntlet announced its departure from Aave, citing frustrations with stakeholder incentives and the inability to execute protective measures in a timely manner. Their exit marked the end of a four-year partnership and ignited broader discussions about expertise and risk assessment in the DAO governance processes.

Had vote buying mechanisms been available in this context, a third party could have hypothetically acquired strategic voting power and vote as recommended by Gauntlet. Gauntlet had issued a clear, data-driven warning about the systemic risks, but its recommendations were rejected due to political sensitivities and a lack of technical understanding among token holders.

In such a hypothetical scenario, strategic vote buying would not have served narrow self-interest, but rather acted as a corrective mechanism, amplifying expert insight to help prevent protocol-level losses.

Pricing of vote buying

Following the exploration of manipulation risks and examples of altruistic vote buying, we now turn to a more quantitative dimension: pricing. Understanding how much it actually costs to buy votes is crucial for evaluating both the strategic viability and governance impact of these mechanisms.

To illustrate this, we use the Arbitrum DAO as a case study, leveraging data from LobbyFi the most active vote buying platform within its ecosystem. LobbyFi's transparency and accessible data make it a valuable example, but the insights derived here offer broader implications for how vote pricing may shape participation, incentives, and the underlying cost of influence in DAO governance more generally.

Other DAOs may experience similar or even more pronounced dynamics, depending on the scale of vote buying platforms, governance design, and liquidity of voting tokens. Thus, while Arbitrum provides a concrete lens, the conclusions in this section are meant to support general understanding and inform DAO design across the ecosystem.

1. The cost of the votes on LobbyFi

The table below displays the participation rate, LobbyFi's influence, the Instant Buying Price set for each proposal, the cost of acquiring 1,000 votes, and the yield generated per ARB based on the market price at the time of voting. A more detailed dataset, including additional metrics, is available here.

Proposals from 2024 are excluded from this summary, as they offer limited insight (the October to December 2024 period is covered in the complete version of the table). The focus on 2025 is more relevant: LobbyFi recently received 18 million ARB from a single wallet, increasing its governance share from 1% to 10% and positioning it as one of the leading delegates within the Arbitrum DAO.

The analysis is based on the assumption that the voting bloc is sold for every proposal. This hypothetical scenario is used to explore the potential impact of vote buying mechanisms.

DATE	PROPOSAL	PARTICIPATION		LOBBYFI PRICING		
		Total ARB votes (M)	LobbyFi Power (%)	IBP (Instant Buying Price) (ETH)	Cost for 1000 votes($)	IBP/ARB (%)
27/03/2025	Arbitrum Onboarding V2	192.0	10.46%	1	0.10	0.026%
27/03/2025	Adopt Timeboost +Nova Fee Swap	243.0	8.27%	18.85	1.88	0.494%
27/03/2025	For Arbitrum DAO to register the Sky Custom Gateway contracts in the Router	188.0	10.26%	10	1.04	0.273%
27/03/2025	GMC's Preferred allocation	186.0	10.38%	0.66	0.07	0.018%
13/03/2025	TMC Recommendation	172.5	11.62%	0.65	0.06	0.018%
06/03/2025	Request to Increase the Stylus Sprint Committee's Budget	163.2	12.21%	1.75	0.20	0.048%
27/02/2025	Arbitrum Audit Program	172.5	11.55%	0.45	0.05	0.008%
27/02/2025	AIP: ArbOS Version 40 Callisto	144.0	13.83%	3.5	0.41	0.061%
20/02/2025	Arbitrum Growth Circles Event Proposal	156.1	13.27%	0.5	0.07	0.010%

DATE	PROPOSAL	PARTICIPATION		LOBBYFI PRICING		
		Total ARB votes (M)	LobbyFi Power (%)	IBP (Instant Buying Price) (ETH)	Cost for 1000 votes($)	IBP/ARB (%)
20/02/2025	Arbitrum D.A.O. (Domain Allocator Offerings) Grant Program - Season 3	165.2	12.54%	13.5	1.78	0.265%
14/02/2025	Stable Treasury Endowment Program 2.0	142.7	14.51%	2.5	0.33	0.049%
13/02/2025	OpCo: A DAO-adjacent Entity for Strategy Execution	161.3	12.84%	7.5	0.97	0.145%
13/02/2025	Request to Increase the Stylus Sprint Committee’s Budget	163.2	12.69%	1.75	0.23	0.034%
06/02/2025	Approve the Nova Fee Sweep Action	168.6	12.28%	18.85	2.53	0.376%
30/01/2025	Arbitrum Strategic Objective Setting (SOS) – Defining the DAO’s Interim Goals	137.9	0.07%	0.2	6.96	1.035%
30/01/2025	Proposal for Piloting Enhancements and Strengthening the Sustainability of ArbitrumHub in the Year Ahead	122.6	0.08%	0.001	0.03	0.005%
23/01/2025	Activate Arbitrum BoLD + Infura Nova Validator Whitelist	135.9	0.66%	0.01	0.04	0.005%
23/01/2025	The Watchdog: Arbitrum DAO’s Grant Misuse Bounty Program	157.4	0.57%	0.001	0.00	0.001%
23/01/2025	Arbitrum D.A.O. Season 3 Elections - Education, Community Growth, and Events	163.3	0.55%	0.001	0.00	0.001%
23/01/2025	Arbitrum D.A.O. Season 3 Elections - Gaming	163.2	0.55%	0.001	0.00	0.001%
23/01/2025	Arbitrum D.A.O. Season 3 Elections - Dev Tooling on One and Stylus	170.2	0.53%	0.1	0.36	0.054%
23/01/2025	Arbitrum D.A.O. Season 3 Elections - New Protocols and Ideas	173.0	0.52%	0.1	0.36	0.054%
16/01/2025	Non-Constitutional: Stable Treasury Endowment Program 2.0	142.7	0.62%	0.01	0.04	0.006%

2. Auction price versus instant buying price

LobbyFi provides two methods for acquiring voting rights: instant buying and an auction mechanism.

Data shows that Instant Buying Prices (IBPs) are frequently set well below the market value of ARB tokens. In 2025, acquiring 19 million ARB votes through the instant route cost between 0.5 ETH and 18.5 ETH, representing less than 1% of the market value of the tokens. The auction mechanism, with a reserve price fixed at 10% of the IBP, brought the minimum price down to just 0.1% of the token's market value.

Given such heavy discounts, auctions have seen limited uptake. Buyers generally favour the certainty of instant purchases over a competitive auction. This dynamic could be changed by two factors:

- A rise in IBPs may make instant purchases less attractive, encouraging greater use of auctions.
- Buyers seeking to minimise costs might choose to participate in auctions, accepting the associated risks of an Instant Buyer stepping in.

If auctions become more widely adopted, vote acquisition strategies may grow increasingly competitive. The structure could begin to resemble a hybrid Futarchy model, where financial resources are actively deployed to influence governance outcomes. While auctions offer a more open and potentially fairer mechanism compared to instant buying, they also introduce a new dynamic, a financial battleground where governance influence is won by those willing to spend the most.

This escalation could deter long-term engagement from delegates and token holders who are either unwilling or unable to continuously pay to protect their voting influence. It risks turning governance into a pay-to-play system.

3. Theoretical voting budget versus actual voting budget

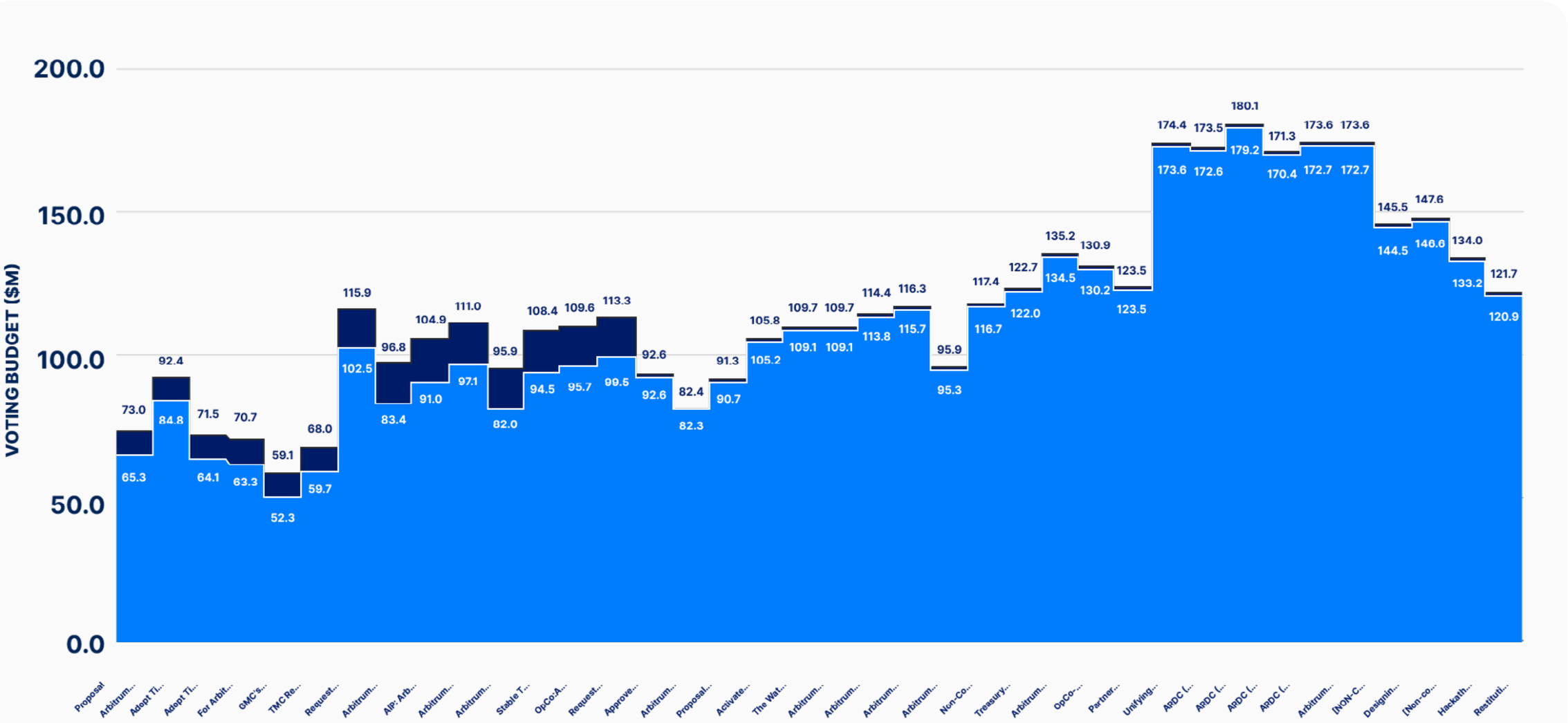
Regardless of the acquisition method, the discounted cost of vote buying creates a gap between the perceived and actual financial weight behind DAO proposals.

The theoretical voting budget reflects the total number of tokens cast, multiplied by their market value. However, a portion of these tokens may have been leased at a fraction of that cost. To account for this, the actual voting budget represents the real capital deployed to secure those votes.

For example, if a proposal received 100 million ARB votes, and 10 million of those were purchased through LobbyFi for 1 ETH (around $2,000), then 10% of the voting power was acquired for far less than its nominal market value.

This discrepancy is illustrated in the chart below, where the most recent proposals appear on the left. The gap is particularly noticeable, with actual voting budgets approximately 10% lower than their theoretical counterparts (Instant Buying is considered here).

Some may argue that delegating ARB to LobbyFi still represents a genuine capital commitment, similar to that of any direct voter. However, the leasing model introduces a distinction between token ownership and participation in governance.



As more tokens become available for short-term leasing, the system risks creating a “security deficit”, where decisions on crucial matters, such as treasury management or security, can be influenced at a fraction of their nominal cost.

This challenges the current definition of quorum, based on token count rather than real financial exposure, which may no longer reflect genuine participation in governance.

4. Yield as a growth lever

As of today, LobbyFi has received delegations from 122 wallets. However, over 92% of the delegated ARB originates from a single wallet, indicating that the protocol's current voting power is heavily reliant on one actor. Still, it is worth noting that LobbyFi remains a relatively young protocol, gradually gaining attention, particularly as vote buying becomes a topic of active debate.

For those delegating tokens to LobbyFi, the primary motivation is yield. Voting power sold or auctioned through the platform generates passive income. But is this yield compelling?

The theoretical yield for Q1 2025 assuming that all eligible proposals had been monetised through instant buy is estimated at 2.7% for the quarter (10.8% annualised). This projection represents a best-case scenario, offering a sense of the mechanism's potential under ideal conditions. However, it remains a purely theoretical benchmark and should not be confused with actual performance.

Based on onchain transactions read directly from the smart contract, only 5.202 ETH were sold via instant buy during the period, compared to the theoretical 81 ETH. This puts the actual yield closer to 0.2% for the quarter (0.8% annualised), far from the theoretical one.

It's also important to note that LobbyFi is still in an exploratory phase, experimenting with pricing dynamics and exploring how buyers and sellers interact with the protocol. As such, it's currently difficult to define a stable or predictable yield.

Three key factors influence both the yield and the broader growth trajectory of LobbyFi:

- The first is the number of proposals submitted by the DAO: more proposals create more opportunities to monetise voting power, and consequently more potential for yield.
- The second is the yield opportunities available for token holders. If the broad DeFi market or the DAO itself offer attractive returns through lending, liquidity provision, staking or incentives, token holders may favour those opportunities over delegating to a vote buying platform.
- The third factor is demand for voting power, as reflected in the prices buyers are willing to pay via Instant Buying.

On the third point, it's worth noting that while raising the Instant Buying Price could address concerns about voting power being sold too cheaply, it may also backfire. If buyers are still willing to pay the higher price, yield would increase, potentially attracting more token holders to LobbyFi. Conversely, if the higher cost discourages direct purchases, demand could simply shift towards auctions.

5. Determining swing potential of a voting bloc

One of the key considerations is whether the purchased voting bloc is large enough to decisively impact the outcome of a proposal. This section introduces a simple approach to evaluate under which conditions a bought voting bloc can swing a vote.

Yes/No votes

In binary proposals, the impact of vote buying can be assessed by comparing the voting power of LobbyFi (V_{LF}) to the margin between “yes” votes (V_Y) and “no” votes (V_N).

When the ratio, $\frac{V_{LF}}{|V_Y - V_N|} > 1$ LobbyFi votes are enough to alter the result.

Most current DAO proposals reflect strong consensus (> 80% sharing the same opinion), making the influence of any single bloc less decisive. However, if future proposals become more contested, which may be expected as the DAO and the market matures, the potential for swing outcomes may increase.

Multiple-choice votes

In elections or proposals with multiple outcomes, vote margins between candidates or options are often tight, making a 10% voting bloc particularly influential.

Consider a scenario with k candidates (C_1 to C_k) and N winners. If candidate C_{N+1} , originally below the cutoff with V_{N+1} votes, gains support from LobbyFi (V_{LF}) sufficient to surpass candidate C_N with V_N votes, the ranking shifts, altering the outcome.

When the ratio, $\frac{V_{LF}}{|V_Y - V_N|} > 1$ LobbyFi votes are enough to alter the result.

The example below demonstrates how LobbyFi's current 10% voting power can influence the outcome within a typical normalised distribution. In this scenario, eight candidates are competing for five positions. With the support of the voting bloc, candidate 6 shifts from sixth to fourth place, ultimately altering the final result.

Candidate	Weight without LobbyFi (%)	Weight with LobbyFi (%)
c1	42.02%	37.82%
c2	33.64%	30.28%
c3	17.27%	15.55%
c4	5.69%	5.12%
c5	1.20%	1.08%
c6	0.16%	10.15%
c7	0.02%	0.01%
c8	0.00%	0.00%

Voting bloc entropy (VBE): detecting behavioural alignment

In this section, we examine how DAOs can use tools like Voting Bloc Entropy (VBE) to assess behavioural alignment, decentralisation, and the impact of vote buying on community trust. While our case study focuses on the Arbitrum DAO, the VBE framework is broadly applicable and offers valuable insight for any DAO looking to evaluate how voting behaviour reflects or conceals underlying concentrations of influence.

We begin by applying the VBE methodology to Arbitrum DAO data, illustrating how this approach can uncover voting blocs based on behavioural patterns. Next, we assess the structural concentration of voting power by examining how voting rights are distributed. Finally, we explore how financial incentives and opaque coordination mechanisms influence perceptions of fairness and legitimacy in DAO governance. to better understand the impact of delegation, alignment, and vote buying on governance quality.

First, we apply the Voting Bloc Entropy (VBE) framework to examine behavioural alignment between voters. This helps identify hidden voting blocs based on identical behaviour (100% similarity) as well as broader ideological alignment (80% similarity), offering insight into both explicit and implicit concentrations of influence.

Second, we analyse the concentration of vote share by evaluating how voting power is distributed across active participants and delegates. This allows us to assess structural centralisation independent of voting patterns.

1. Voting bloc entropy (VBE): detecting behavioural alignment

The Voting Bloc Entropy (VBE) framework offers a method for evaluating decentralisation by analysing how similarly participants vote, shifting the focus from individual wallets and token balances to patterns of voting behaviour. Instead of measuring token distribution alone, VBE clusters addresses into voting blocs based on how closely their voting choices align, revealing behavioural patterns that may suggest either implicit ideological cohesion or coordinated intent.

We applied this framework to a dataset of 69 Arbitrum DAO proposals, comprising over 42,662 unique voting wallets. Using a series of similarity thresholds (100%, 90%, and 80%), we aimed to evaluate different levels of alignment:

- 100% similarity was used to detect perfectly aligned wallets, which could indicate hidden coordination or shared control.

- 90% similarity captured tighter ideological or strategic alignment, not perfect, but highly consistent behaviour.
- 80% similarity aimed to identify looser coalitions, where wallets vote similarly most of the time, perhaps reflecting shared values or governance priorities.

2. Behavioural alignment at each threshold

100% similarity

At this strictest threshold, no multi-wallet blocs were detected after filtering for wallets that voted on more than 10 proposals. This suggests that wallets in Arbitrum governance generally vote independently, with no clear evidence of tightly coordinated voting across proposals.

90% similarity

At the 90% threshold, a few tightly aligned blocs did emerge, but none exhibited both alignment and distributed influence. The largest bloc that met the criteria held 7.00 million ARB, accounting for 2.06% of the delegated supply. However, this voting power was almost entirely concentrated in a single wallet.

Other 90% blocs had more addresses but lacked participation from top stakeholders, with only 1 wallet ranked within the top 100K holders. This highlights a key insight: high alignment does not necessarily translate to high influence, and tightly aligned behaviour is rare among well-capitalised voters.

80% similarity

At the 80% similarity threshold, a dominant bloc emerged: 895 wallets collectively holding 28.98 million ARB, or 8.52% of the delegated supply. Among them, 88 wallets ranked in the top 100K holders, suggesting this bloc includes a mix of mid- and high-tier participants.

This bloc exhibited strong alignment, but no signs of formal coordination. Instead, the similarity likely reflects shared governance preferences or ideological leanings, forming a bottom-up behavioural pattern rather than top-down influence.

3. Voting bloc entropy scores across similarity thresholds

To quantify the influence of aligned voter groups within the Arbitrum DAO, we calculated min-entropy scores for each similarity threshold as part of the Voting Bloc Entropy (VBE) framework. This approach focuses not on how many tokens a wallet holds, but on how voting power is concentrated among groups of wallets that tend to vote similarly.

In this context:

- High entropy indicates that voting power is distributed across many independently acting blocs, signalling strong decentralisation.
- Low entropy implies that a small number of blocs dominate, pointing to a centralised structure.

The score ranges from 0 to 6:

- A score of 0 means one bloc controls all the voting power (complete centralisation).
- A score of 6 means the largest bloc controls only ~1.5% of the delegated supply (maximum decentralisation).

The table below summarises the key statistics and min-entropy scores observed at both the 80% and 90% similarity thresholds.

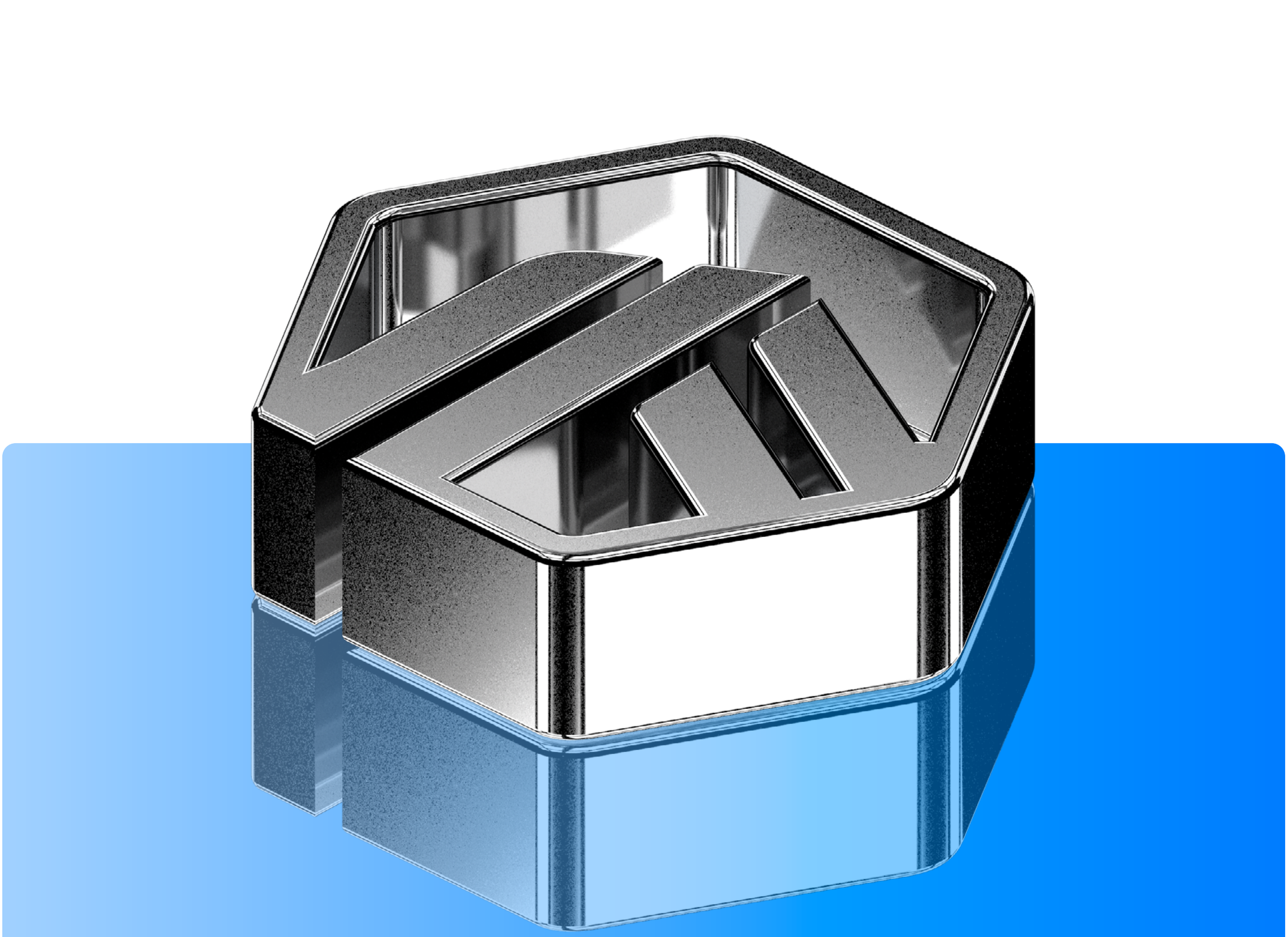
Voting bloc entropy comparison (relative to 340m votable ARB)

Metric	80% similarity	90% similarity
Number of wallets in bloc	895	10
Wallets in top 100k holders	88	1
Voting power (ARB)	28.98 million	7.00 million
% of delegated supply (340M)	8.52%	2.06%
Min-entropy (H_{min})	3.55	5.60

At the 80% threshold, the largest aligned group held 8.52% of the delegated supply, resulting in a moderate min-entropy score of 3.55 suggesting that while alignment exists, no single group dominates governance outcomes.

At the 90% threshold, the leading bloc controlled just 2.06% of the supply, yielding a high entropy score of 5.60, indicating that power is widely distributed and tightly aligned blocs are not influential at this level.

These scores highlight that Arbitrum governance remains decentralised, with some behavioural clustering at lower thresholds but no concentration of decisive power within any single bloc.



Recommendations

Vote buying mechanisms are now a recognised feature of onchain governance, presenting new challenges and trade-offs for DAOs. As these practices evolve, DAO communities must weigh their tolerance for market-driven governance against their desire for legitimacy, transparency, and decentralisation. This section outlines a generalised spectrum of responses that DAOs might consider.

We group responses into three categories—Passive, Active, and Interventionist—each representing a different level of engagement with vote buying activity. These are not prescriptive blueprints, but rather flexible design options that DAOs can adapt to fit their governance model, token structure, and community priorities.

While specific examples in this section draw from past patterns, including in Arbitrum and similar DAOs, the recommendations are intended to be broadly useful across ecosystems.

Passive approach

This approach focuses on maintaining openness while allowing organic behaviours to develop without direct interference. Rather than building restrictions, it supports governance through indirect signals like incentives, awareness, and participation tooling.

1. Engaging with vote buying platforms

Rather than excluding vote buying platforms, DAOs may consider engaging with them directly to increase transparency and shape practices. Areas of discussion could include pricing models, delegation caps, and vote timing mechanisms.

For example, increasing Instant Buying Prices could lead to more accurate market-based pricing but risks concentrating power among wealthier participants. Delegation caps could limit the influence of any one platform by aligning with average delegate sizes or expected vote margins. Timing constraints, such as advance voting deadlines, might enhance transparency but would require robust technical enforcement.

These trade-offs underscore the value of dialogue between DAOs and vote buying platforms to maintain governance balance while reducing manipulation risks.

2. Incentivising participation

Many token holders are drawn to vote buying platforms for yield opportunities. To counteract this, DAOs might explore introducing governance-aligned incentive models, such as staking rewards for delegation to active, accountable delegates. These systems would provide a competing incentive to passive vote selling.

DAOs could also consider delegation from treasury-held tokens or launch targeted delegation campaigns to reinforce engagement. The goal is to increase meaningful participation while reducing reliance on external platforms.

3. Evaluate awareness campaigns and interface improvements to encourage organic delegation

To increase the share of active voting supply, DAOs could integrate delegation into broader incentive programs—e.g., rewarding one-time delegation through quests or participation-based airdrops. Initiatives should prioritise quality, ensuring only active or verified delegates are eligible.

A similar strategy had been explored by Optimism through the Delegate Quest SDK Mission, proposed by RabbitHole in collaboration with StableLab. The initiative aimed to create an open-source infrastructure that enables quests rewarding both delegators and delegates. Examples include targeting newly eligible wallets, encouraging re-delegation to active delegates, and linking quest participation to community education efforts.

Evidence from similar initiatives suggests that even small rewards can yield durable impact. In a recent Optimism pilot, over 83% of wallets that delegated OP via quests remained delegated after the incentive period ended. This demonstrates that one-time delegation nudges, if well-structured, can lead to long-term governance participation.

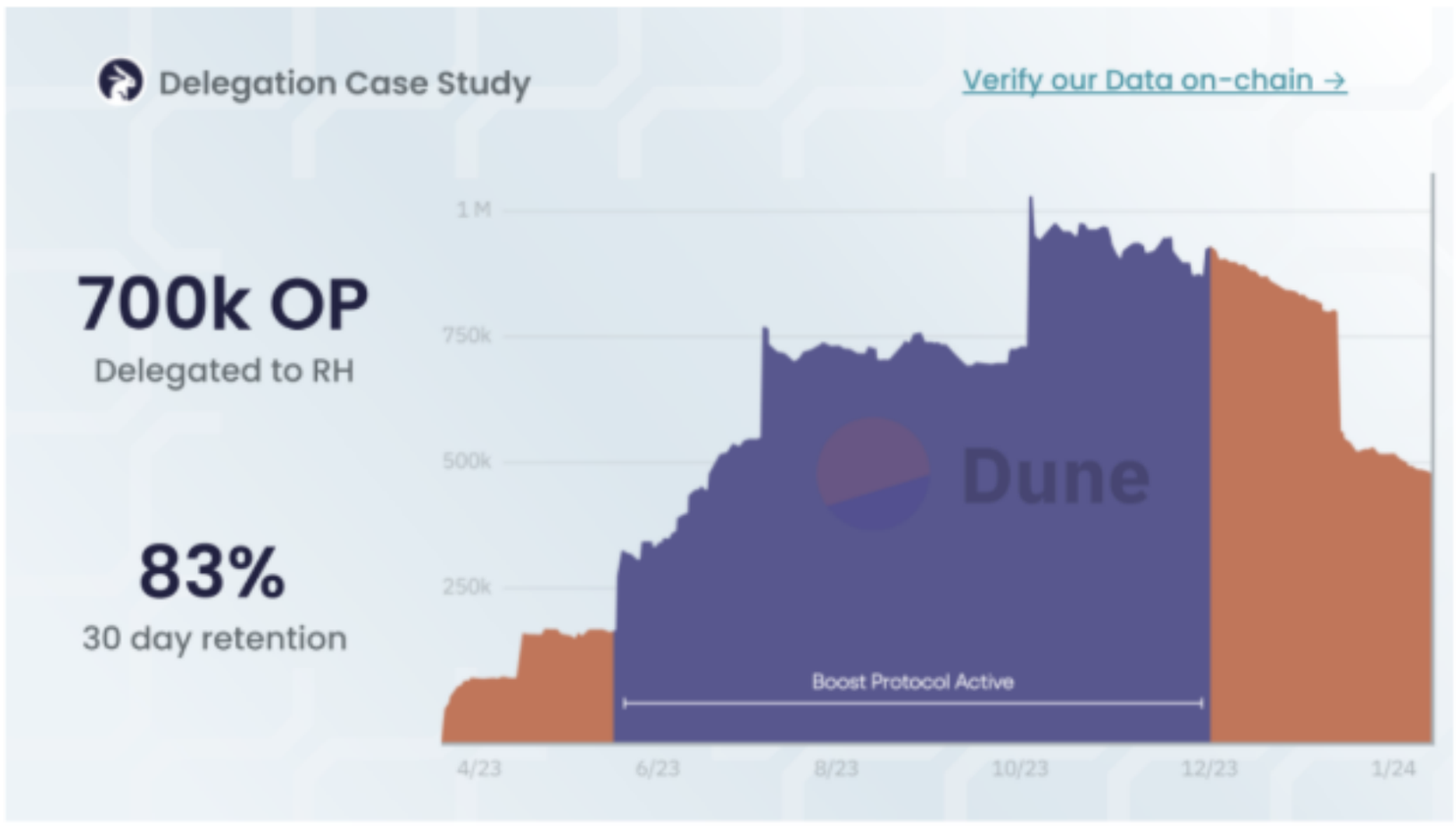
tnorm 1 chaselb Feb 2024

Hi @chaselb, I think you're under-estimating the stickiness of delegation. Most users who have delegated have done so passively, with a set-it, forget-it mentality.

While Optimism's airdrops reward this passive behavior, direct incentives provide an opportunity to *actively* direct delegation, allowing for those who have delegated to inactive delegates, who have not participated or engaged in governance, to be compensated w/ more governance power (OP) in order to direct their voting weight towards valuable contributors.

These types of quests might be less effective if conducted on a rolling basis, but as an experiment over a few months I think it's hard to argue the potential benefits here for the ecosystem at large. One just needs to take a look at voting on the current Mission Requests to understand the need for greater participation…

Happy to answer further questions :).



Additionally, DAOs should improve delegation interfaces, simplify onboarding flows, and raise awareness around the impact of participation. Evidence from similar programs in other ecosystems shows that even modest incentives can lead to lasting delegation behaviour.

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Active approach

An active posture involves engaging directly with emerging vote buying platforms and exploring structural enhancements such as transparency tools, voting data analysis, or soft coordination mechanisms, without blocking participation or imposing limits.

1. Introducing alternative governance mechanisms

DAOs may consider introducing alternative governance designs that promote alignment and accountability. The proposed model is built around several key principles:

- **KPI-based proposals:** structuring proposals around clearly defined, measurable outcomes to allow for more objective evaluation of their success.
- **Resolution-based incentives:** rewarding (or penalising) participants based on how closely the actual results match the predefined KPIs.
- **Token locking until resolution:** encouraging accountability by locking governance tokens until the proposal's outcome can be measured against its KPI, while still allowing holders to vote on future proposals during the lock period.
- **Empowerment of smaller holders and experts:** enhancing inclusivity by introducing voting blocs or influence multipliers for contributors with relevant expertise or lower capital.

These principles are not intended as a replacement for the existing system but as a starting point for discussion, offering a way to rethink governance structures in a way that balances market-driven mechanisms with broader community values while mitigating the potential risks of vote buying services.

2. Establish an emergency response plan for governance threats

To stay ahead of potential vote buying attacks, DAOs could explore the creation of threat monitoring frameworks. These systems might track the accumulation of voting power across vote buying platforms and lending markets, alerting stakeholders when specific thresholds like quorum or high historical turnout levels are approached.

DAOs might also define transparent emergency coordination procedures with relevant ecosystem actors. This could include clear steps for information gathering, validation, and proposed responses in case of manipulation threats. Even without formal enforcement mechanisms, clearly defined contingency plans can help DAOs act decisively and maintain confidence under pressure.

Interventionist approach

This approach introduces more assertive options for reshaping governance outcomes such as voting power redistribution, proposal-level vote signalling, or platform-specific caps. It's best viewed as a strategic realignment tool rather than a punitive measure.

1. Explore delegation of treasury owned arb to independent delegates using algorithmic distribution

If DAOs find that vote buying platforms are accumulating too much influence, they may consider counterbalancing this by delegating treasury-held tokens to active, independent delegates. This promotes decentralisation and enhances participatory diversity.

Delegation models could be algorithmic, distributing tokens based on metrics like participation, proposal authorship, or community engagement. These models can be time-bound, with performance-based adjustments and revocation mechanisms to ensure adaptability.

The aim is not to restrict vote buying outright, but to amplify credible governance voices and ensure governance remains inclusive and resilient.

2. Allow proposers to indicate whether vote buying is permitted on their proposals

DAOs could allow proposers to include a flag in their proposals indicating whether they prefer vote buying to be permitted. While not enforceable by default, such a flag could serve as a soft governance norm, signalling community intent.

Over time, DAOs may choose to build infrastructure to support enforcement—such as countervoting efforts, reputation systems, or social consensus tools. However, this must be approached cautiously to avoid undermining the principle of equal vote weight.

By surfacing proposer preferences and encouraging transparency from platforms, DAOs can strengthen shared norms and improve signal clarity around the intent and integrity of governance decisions.

DLResearch

An Analysis of the Role of Vote Buying in DAO Governance

Stan Colebrander & Sebastien Nave, Analyst

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