Corruption is not enough

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1 Summary

One token, one vote mechanisms are the primary governance mechanisms used by DAOs. However, one token, one vote and other token voting governance systems operate as effective plutocracies and are widely considered vulnerable to corruption and attack.

Large or mature DAOs, and many newer DAOs, have introduced vote delegation in an attempt to scale governance, mitigate voter apathy, and alleviate the risks of plutocracy.

However, the most recent and well-known examples of plutocracy are from DAOs, including ENS DAO, Sushi DAO, and MakerDAO, in which vote delegation is enabled and sometimes mandatory.

We examine the DAO governance problem space and highlight promising in-market solutions, including hybrid governance, metagovernance, and market-based governance.

We propose cryptoeconomics as a viable solution space for further research and present a prototype that seeks to improve stakeholder cooperation in DAO Governance through incentives designed to make corruption an unprofitable strategy.

2 Motivation

2.1 Decentralised Autonomous Organisations

DAOs are a novel form of organisation, uniquely enabled by blockchains.

The components of an organisation include, but are not limited to:

1. an **objective** or **purpose**
2. a membership policy that produces a set of **members**
3. an **allocation mechanism** (how the organisation allocates resources), e.g., capitalism, entrepreneurship
4. a **governance mechanism** (how to update the organisation's properties), e.g., democracy, board of directors, token-voting
5. a **standardised store of value** (how to represent the value of the organisation's resources), e.g., currency, equity, tokens

Through blockchains, DAOs proffer the benefits of coordinated human effort at scale without the downsides of centralisation, such as rent-seeking, corruption, collusion, single-point-of-failure, bureaucracy, and capture that undermine our existing institutions.

Generally, many DAO proponents expect DAOs to outperform relative to traditional institutions in the provision of public, common, or club goods because these are the goods most prone to capture by a centralised entity, e.g. the state.

It follows that, if Public Goods DAOs are a successful innovation, resources will flow from the state to DAOs leading to an increase in the provision of public goods that do not suffer from the problems caused by centralisation.

In practice, however, it appears that DAOs may not eradicate these issues but simply move them through time and space1. Hence, our simple DAO implementations remain vulnerable to many of the issues we expect them to offer an escape from.

2.2   DAO Governance

*DAO governance involves a network of participants coordinating, **without a centralised actor with privileged rights,** to make decisions in pursuit of some goal or outcome, and is formalised or defined under set of shared context(s), e.g. a geography, the law, a market, a cause, etc.*

DAOs, like other organisations, implement their own endogenous rulesets that govern all components and the interactions between them, such as the law in the case of nations, compensation, taxation, resource allocation, social choice, etc.

DAOs are similarly governed by exogenous policies dictated by their environment such as the law in the case of corporations, market forces, international relations, physics, blockchain protocols, etc.

Governance mechanisms are, therefore, the component of DAOs that mediates all components and the interactions between them. In particular, the translation of stakeholder preferences into decisions required for the DAO's instantiation, the enforcement of its boundaries, and its continued operation in accordance with environmental rules, and in respect of competing rulesets, i.e. other DAO governance mechanisms.

A description of a DAO's governance mechanism, including the set of functions and parameters under the mechanism's control, all components, and the interactions between them would sufficiently describe the DAO such that a DAO's governance mechanism could be considered the DAO itself. Therefore, addressing problems in DAO Governance is potentially the highest value problem to solve in DAOs today to ensure their adoption.

2.3   DAO Governance Models

Note: We recognise that token-voting, is democratic in nature but far from a democracy in the literal sense, however we will use the term democracy to adhere to convention in the broader literature

Models include:

- Direct Democracy
- Representative Democracy
- Reputation-based Voting

2.3.1 Direct Democracy

One token, one vote on every proposal

Description

In a direct democracy, token-holders make decisions by voting on proposals, where each token is equivalent to a vote. Currently, this is the governance mechanism used by the majority of DAOs, especially smaller, younger DAOs.

Governance must configure the following parameters:

- Who has the right to create a proposal
- How to convert token votes to a decision, e.g. majority-rule, supermajority, quorum-contingent

Benefits

- Bundling financial upside and governance rights aligns risk and responsibility which incentivises those with the most to gain from price appreciation to make decisions that directly or indirectly maximise price appreciation
- This is a copy of the equity system which makes it easy for holders to understand

Limitations

- Keeps out those who may be affected by governance but don't have the capital to acquire governance rights
- Tends towards plutocracy which if left unchecked leads to failure through a focus on price appreciation, regardless of negative externalities

Examples

- PleasrDAO, Aavegotchi, VitaDAO

2.3.2 Representative Democracy

One token, one vote on every proposal with vote delegation

Description

In a representative democracy, token-holders make decisions by voting on proposals, where each token is equivalent to a vote, but can also delegate their voting power to a representative. Delegated voting is increasingly becoming the most popular governance mechanism, especially for mature, large DAOs. Governance must configure the following parameters:

- Who has the right to create a proposal
- How to convert token votes to a decision, e.g. majority-rule, supermajority, quorum-contingent
- Which rights can be delegated and to who

Benefits

- Aligns incentives by unbundling financial risk and governance power and allocating them to domain experts
- Allows governance rights to accrue to representatives voters believe are best placed to represent their preferences
- Reduces voter apathy

Limitations

- As delegation scales, the nuance of voter preferences is diluted to the preferences of a smaller subset of voters, i.e. the delegates, which is less representative of the population
- Forces the voter to find a single delegate who represents their entire range of preferences across all possible decisions (though tokens could be split across wallets or delegation functionality enhanced)
- Allowing voters to delegate enables a more persistent form of voter apathy, as seen in our traditional political system

Examples

- Uniswap, Gitcoin, Compound, ENS, MakerDAO, AAVE, Radicle, Nouns DAO

2.3.3 Reputation-based Voting

One person, one vote OR One contribution/reputation unit, one vote on every proposal

Description

Non-transferable voting based on your membership, reputation and, or contribution.

Benefits

- more equitable
- aligns contribution and power
- not vulnerable to plutocracy

Limitations

- only as performant as the system's ability to measure contributions and assign relative value
- assumes equal exposure to externalities
- inability to express preference intensity

Examples

- Optimism

3 Problems

3.1 Problem Space

The problem space is defined as DAO Governance, in particular:

- DAO Governance Attacks
- DAO Governance Corruption
- DAO Governance Capture
- DAO Governance Operations

3.2 Properties

- **Stakeholder.** Any individual, collective, or entity that experiences externalities due to the actions of the DAO, e.g. Token-holder, user, delegate, staker/miner, etc.
- **Participant.** Any individual, collective, or entity that participates in governance
- **Preference.** A stakeholder's subjective comparative evaluations over a range of options, e.g. a miner prefers to increase the block reward, over reducing rewards or keeping rewards constant
- **Objectives.** The goal or set of goals that constitute the DAO's organizing purpose, e.g. "Buy the constitution", "Fund Public Goods"
- **Acts.** The set of actions or decisions the DAO's governance mechanism is able to produce and its stakeholders consider, e.g. Add a new asset as collateral in our lending protocol, remove a particular voter's voting power, increase token supply, offboard a contributor, suspend the protocol
- **Outcomes.** The set of outcomes the DAO's governance mechanism is able to achieve through its actions, e.g. Token Price increases or remains stable, protocol users increase

3.3 Dimensions

To measure the effectiveness of a DAO's governance, we consider the following dimensions:

- **Stakeholder Representation.** The distribution of voting power relative to DAO stakeholders, i.e. users, token holders, stakers, liquidity providers, etc.
- **Preference Representation.** The degree to which governance participants are able to express their preferences with respect to the DAO's objectives, e.g. I do not believe the voting mechanism is legitimate
- **Alignment.** The consistency of a decision when compared to a desired outcome
- **Coherence.** The consistency of a series of decisions when compared to one another, with respect to a desired outcome

- **Legitimacy.** Power granted by governance participants to the governance mechanism through their ongoing implicit agreement to be bound by its decisions

3.4 Problems

3.4.1 Corruption Problems

Opportunism   Where a single stakeholder or group of stakeholders is rewarded for acting in their own self interest while punishing all other stakeholders and producing outcomes that do not align with the DAO's objectives.

Example: Proposing or voting for salary increases or against salary cuts during a budget-cutting exercise.

Symptoms: - Deviation between outcomes and objectives - Increase in actions or decisions that do not align with objectives - Illegitimate diversion of funds

Capture   Where a minority group of stakeholders possess the power to dictate the DAO's actions to serve their own preferences while punishing all other stakeholders and producing outcomes that do not align with the DAO's objectives.

Example: Plutocracy, Bureaucracy

Symptoms: - Deviation between outcomes and objectives - Increase in actions or decisions that do not align with objectives - Illegitimate diversion of funds

Collusion   Where two or more stakeholders or stakeholder groups that operate within or outside the boundaries of the DAO cooperate for their mutual benefit, to the detriment of all other stakeholders and the DAO's ability to achieve its objectives.

Example: Vote Buying

Symptoms: - Deviation between outcomes and objectives - Increase in actions or decisions that do not align with objectives - Illegitimate diversion of funds

3.4.2 Attack Problems

Capital Structure Exploitation   Where an individual or group is able to exploit vulnerabilities in the DAO's governance mechanism to extract capital.

Example: Treasury Drain Attacks, Price Manipulation Attacks, Arbitrageurs, etc.

Symptom: - Illegitimate diversion of funds

3.4.3 Operation Problems

Inertia or gridlock   Governance is not able to produce decisions that meet the demands of DAO participants or does not reliably produce decisions that align with the objectives of the DAO.

Example: Infighting, voter apathy, failure to achieve quorum

Symptom: - Reduction in actions and decisions that align with objectives

4   Governance Innovations

DAO Governance, unlike corporate and public governance, is both public and open source. The principles of the open source community, specifically the ability for anyone to copy and reuse code provides many opportunities for governance innovation—some of which we've shared above.

Metagovernance, Hybrid Governance, and *Market Governance* are three categories of governance innovation that may offer effective solutions to governance attacks, corruption, and capture.

4.1   Metagovernance

Metagovernance, in the context of DAOs, is the term commonly used to describe any activity where one governance mechanism, typically a DAO, exerts influence on the governance of another DAO.

Metagovernance is a transparent, often automated, vote buying mechanism that incentivises a target DAO's token-holders to take an action that benefits the mechanism's stakeholders, e.g. influence over governance decisions, direction of token emissions, etc.

Metagovernance creates a secondary set of incentives, or meta-incentives, that augment the behaviour of primary token-holders.

In one-off instances of metagovernance, such as in the case of FEI and Index Coop, the Fei team were able to gain influence in AAVE's governance using Index Coop's token holdings.

There are also extended forms of metagovernance with DAOs whose entire purpose is to control the governance of other DAOs, such as Convex Finance.

4.1.1   Curve emissions with Convex Finance

Convex was designed to maximise control over CRV emissions on the Curve protocol.

Convex works by reimplementing Curve's vote-escrow token mechanics to pay CRV holders with CVX emissions to lock their CRV tokens in Convex's contract. Convex, in turn, lock these CRV tokens using Curve's contracts to receive the

maximum CRV emissions, which they share with CVX holders, and voting power, which they use to vote for greater token emissions on the token pairs selected by CVX holders.

As of this writing, the Convex protocol controls 51% of all vote-escrowed CRV, an indicator of the effectiveness of meta-incentives in one-token, one-vote governance mechanisms.

4.1.2   Redacted Cartel, Hidden Hand

Hidden Hand from Redacted Cartel facilitates vote-buying campaigns for participating DAOs.

Vote buyers, or bribers, deposit bribes for active proposals from a number of partner DAOs and users delegate governance tokens to Hidden Hand's protocol. The protocol then distributes votes to maximise returns for its users in exchange for a 4% commission of the bribes received.

As an example, $851,364 worth of bribes were deposited for 61 proposals on Aura Finance and $2,346,024 was deposited for 27 proposals on Balancer.

Hidden Hand also allows partners to implement their own bribe marketplaces so users can select which bribes to accept in exchange for their votes.

4.1.3   FEI Asset Listing on AAVE with Index Coop

Index Coop, a provider of token indexes, actively encouraged metagovernance for a small number of the tokens held in their DeFi Pulse Index, namely Maker, AAVE, and Compound, which they named metagovernance-as-a-service.

Under this arrangement, holders of INDEX tokens acquired the ability to use governance tokens held to facilitate DPI's role as an index to make proposals or vote on proposals within MakerDAO, Aave, and Compound.

In September 2021, FEI protocol, a stablecoin issuer, created a proposal to list the FEI token on AAVE, using the AAVE token holdings in Index Coop's DPI.

AAVE's governance, specifically, requires 80,000 AAVE tokens before a holder can make a governance proposal. At that time, AAVE was trading at $327.04, setting the price of making proposals on AAVE at over $26m.

FEI were able to use $4m of INDEX tokens to control over 118,000 AAVE, worth ~$36m allowing the team to successfully list their token on AAVE.

4.2   Hybrid Governance

Hybrid governance is here defined as the combination of two or more governance models within a single DAO governance mechanism.

This approach is typically pursued where DAO governance designers believe that outcomes can be better-aligned to the DAO's objectives by limiting the influence

of a group of stakeholders who may be over-represented in a one-token, one-vote model. Alternatively, hybrid governance could be implemented to give greater weight to the preferences of group of stakeholders who are underrepresented or have no means to express their preferences except to "vote with their feet", which is a loss for all stakeholders.

Hybrid governance modulates the influence of one set of stakeholders by distributing voting rights to another set of stakeholders, especially groups whose may be marginalised by the preferences of the dominant voting bloc.

Voting power is redistributed until each group is able to provide sufficient checks and balance on the power of other groups.

4.2.1 Lido's stETH Dual Governance

LidoDAO's is governed by LDO holders. Unfortunately, users that stake ETH in the Lido contract receive stETH, which confers the holder no voting rights.

This structure allows Lido holders to make decisions that benefit LDO holders at the expense of stETH holders.

The goal of Lido's Dual Governance proposal "is to prevent the Lido DAO governance from changing the covenant between the protocol and stakers without consent from the latter."

The proposal grants stETH holders a vetocracy over proposals that are deemed to break the agreement under which users stake their ETH on Lido. stETH holders can signal their disagreement with a proposal by staking stETH in a vote escrow contract and once a minimum threshold is reached the proposal will be temporarily blocked to allow the community to negotiate. stETH holders can vote to block, amend, or pass the proposal after negotiations.

This power gives stETH enough power to limit opportunism on behalf of LDO token holders without burdening stakers with ongoing governance overheads.

4.2.2 Optimism's Hybrid Governance

Optimism, through the optimism collective have implemented a bicameral legislative process, comprising a 'Token House' within which voting powers are granted through token ownership, and a 'Citizens' House', within which voting powers are granted through non-transferrable NFTs or "soulbound tokens".

The team explains that this approach is "a large-scale experiment in non-plutocratic governance" but, so far, there are limited details though the Citizen's House's remit appears to be reserved for retroactive public goods funding whereas the Token House has a more traditional DAO governance remit, e.g. governance fund grants, protocol upgrades, director removal, etc.

4.3 Market Governance

Market Governance is co-opted from Market Governance Mechanisms to describe a mechanism that leverages the competitive forces of the open market to influence the behaviour of stakeholders.

As DAOs have scaled in scope, market cap, and contributors, governance has run into issues of corruption, inertia, and in-fighting, especially where the DAO's operations are complex.

As the range and diversity of stakeholders increases, and the potential set of actions and decisions expand, governance must increase its throughput to accommodate, without creating a self-serving bureaucracy.

4.3.1 MakerDAO's MetaDAOs

The solution proposed by Rune in Endgame is a decomposition of Maker into a single core DAO comprising the main functions of the Maker protocol and a collection of smaller "MetaDAO" governance units with their own governance and governance token with the freedom to pursue any viable market opportunity while leveraging some of the resources of the core DAO.

This innovation affords MakerDAO the ability to maintain a small set number of governance-controlled parameters for the core protocol, while the market provides the incentives to steer governance for its MetaDAOs.

This governance upgrade is in the process of being deployed at MakerDAO so its efficacy is yet to be measured.

5 Proposal

Each governance innovation provides a solution to an aspect of DAO Governance.

Metagovernance provides a system of secondary incentives to reward or punish governance participants for taking a set of desirable actions.

Hybrid Governance redistributes voting power among stakeholders using secondary governance mechanisms to create a system of checks and balances on those who accrue majority power in the primary mechanism.

Market Governance decomposes governance into self-contained organisations and leverages market forces to create alignment between each group as a limit on bureaucracy and corruption.

These mechanisms improve stakeholder cooperation and alignment using a system of incentives that originate from three sources. *Metagovernance* incentives are provided by a mechanism or protocol. *Hybrid Governance* creates a system of punishments for corruption, which are provided by other stakeholders or peers. *Market Governance* incentives are provided by the market through competition.

Should governance attack, corruption, or capture be detectable by a governance mechanism, other stakeholders, or competing mechanisms, a set of economic incentives can be designed to offset the proceeds of these acts, rendering them unprofitable.

Through our investigations in the field of cryptoeconomics, we aim to design a mechanism or collection of mechanisms capable of providing sufficient guarantees about cooperative behaviour in DAOs.

Next, we present an initial exploration in this direction.

6 Molten

Molten is WIP. This document will be updated as we conduct ongoing research and development

Molten offers permissionless deployment of hybrid governance mechanisms in a DAO.

6.1 Actors

Molten is designed to coordinate the actions of three actors:

Fundraisers. Stakeholder with the objective to accrue voting power to express their preferences, but lack resources. Equivalent to a delegate in a DAO with vote delegation.

Liquidity Providers. Stakeholder with the objective to accrue voting power to express their preferences, and have adequate resources.

DAO Governance. Governance mechanism with the objective to secure and allocate resources in pursuit of its objective.

6.2 Components

Molten is comprised of:

Fundraiser Contract. Contract created by Fundraisers to store liquidity, lock Governance Tokens, and issue mTokens. Contract also exposes `exchange` function which can be called by the target DAO's treasury address.

mTokens. Tokens issued to Liquidity Providers following a successful exchange. Each token represents a claim on the underlying governance tokens locked in the Fundraiser contract.

Price Oracle Oracle used to determine the governance token exchange rate when the `exchange` function is called.

6.3   Operation

Molten functions by:

1. Pooling liquidity from minority stakeholders for DAO governance tokens, thereby incentivizing DAOs to sell governance tokens and distribute voting power in exchange for deep on-chain liquidity

2. Locking governance tokens in a contract under the control of its owner, the fundraising stakeholder responsible for deploying the contract, or another governance mechanism, incentivizing stakeholders to seek governance corruption or capture where there are opportunities to aggregate and represent minority interests in exchange for voting power

3. Issuing governance token derivatives to liquidity providers, redeemable at maturity for the underlying governance tokens and free to trade on secondary markets, while amplifying their preferences through vote delegation, incentivizing liquidity providers to seek out stakeholders that suitably represent their preferences

4. Granting governance token derivative holders a means to liquidate the contract, for a penalty, if the fundraising stakeholder is no longer voting in-line with their preferences, incentivizing fundraising stakeholders to avoid deviating from their agreement with liquidity providers when voting in the target DAO

6.4   Outcome

Molten combines both peer incentives, used to incentivize participants to identify governance capture and corruption and increase stakeholder cooperation, and market incentives, to surface and distribute voting power to the most competent and motivated stakeholders capable of keeping powerful voters in check.

We expect peer incentives will provide sufficient rewards to stakeholders that identify corruption or capture2, in the form of delegated voting power, to limit potential gains from either strategy. We expect market incentives to provide sufficient incentives to encourage cooperation across stakeholders and inform DAO Governance through the proportion of tokens locked in a given mechanism.
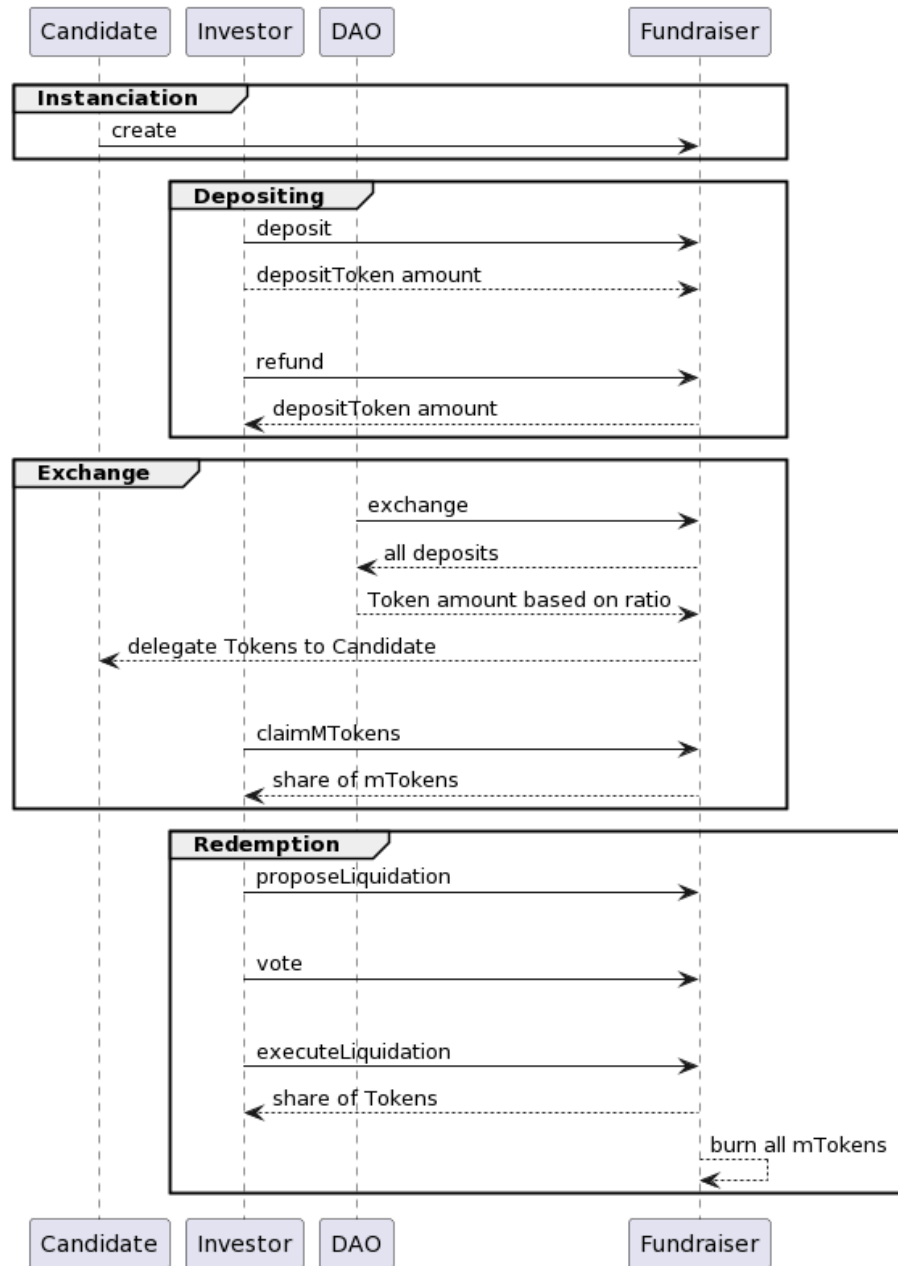
6.5   Implementation

A prototype implementation can be seen here.

A   Molten v1

Figure 1: Sequence diagram